

AMERICAN JOURNAL OF PUBLIC HEALTH *and* THE NATION'S HEALTH

VOLUME 25, 1935

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Official Monthly Publication of the American Public Health Association

Volume 25

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Number 1

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Executive Office, 50 West 50th Street, New York, N. Y.

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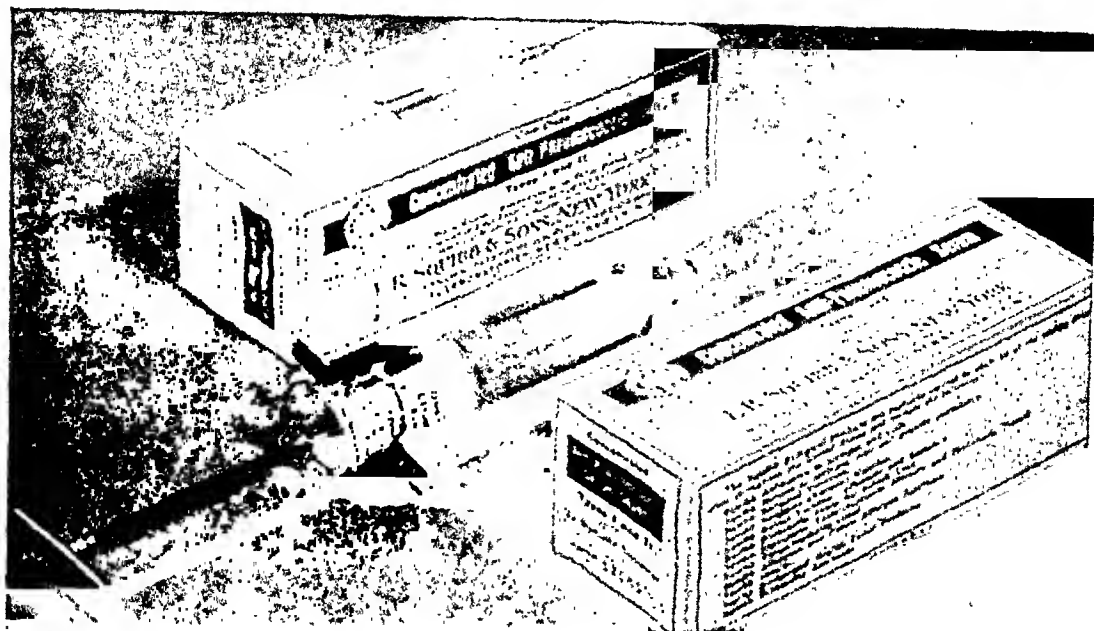
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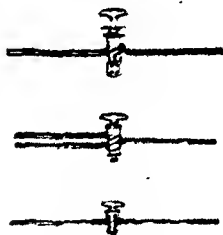
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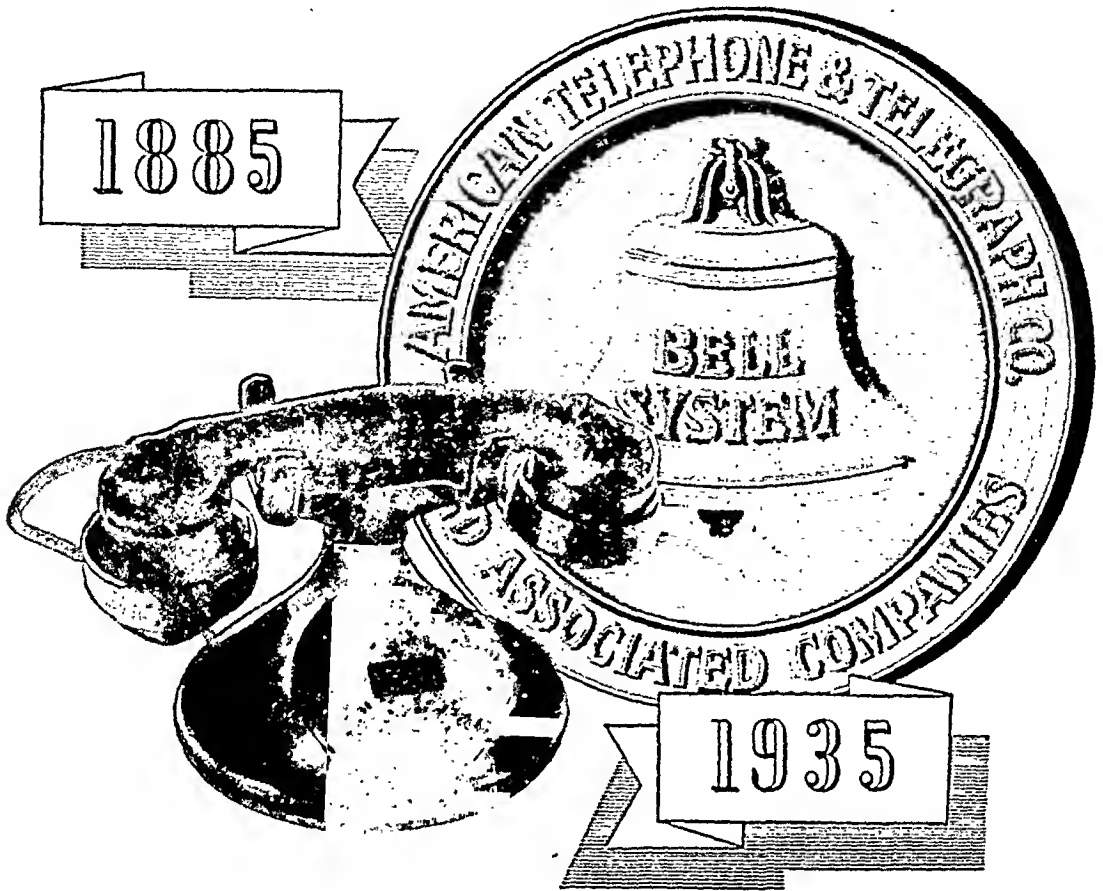
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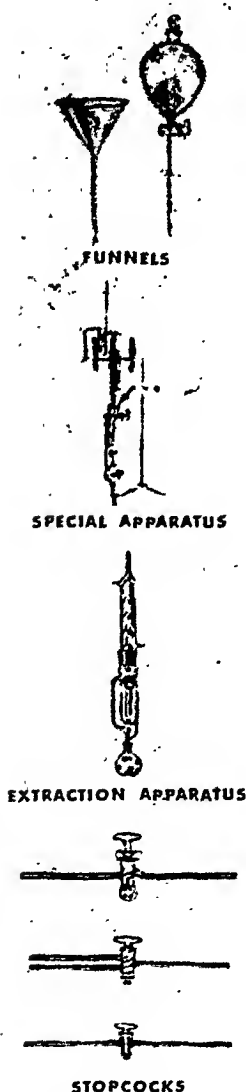
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Official Monthly Publication of the American Public Health Association

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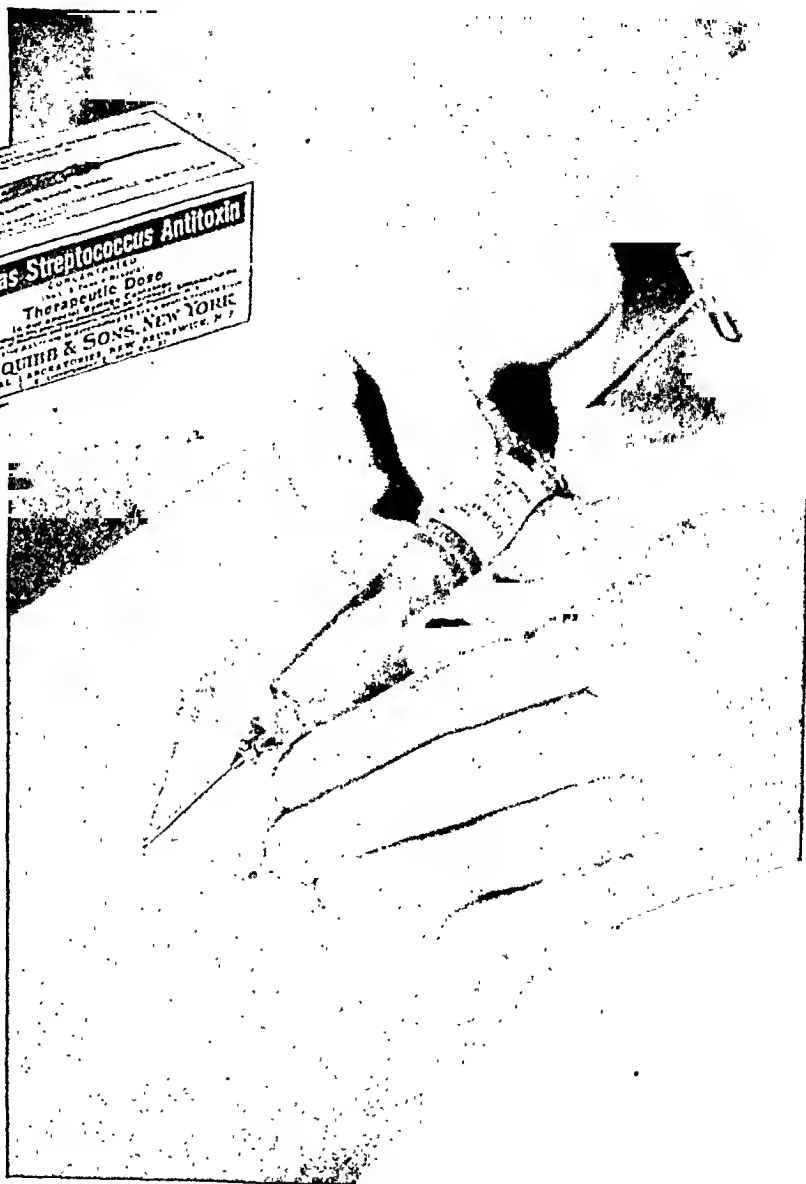
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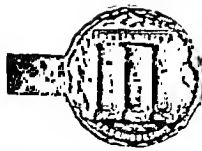
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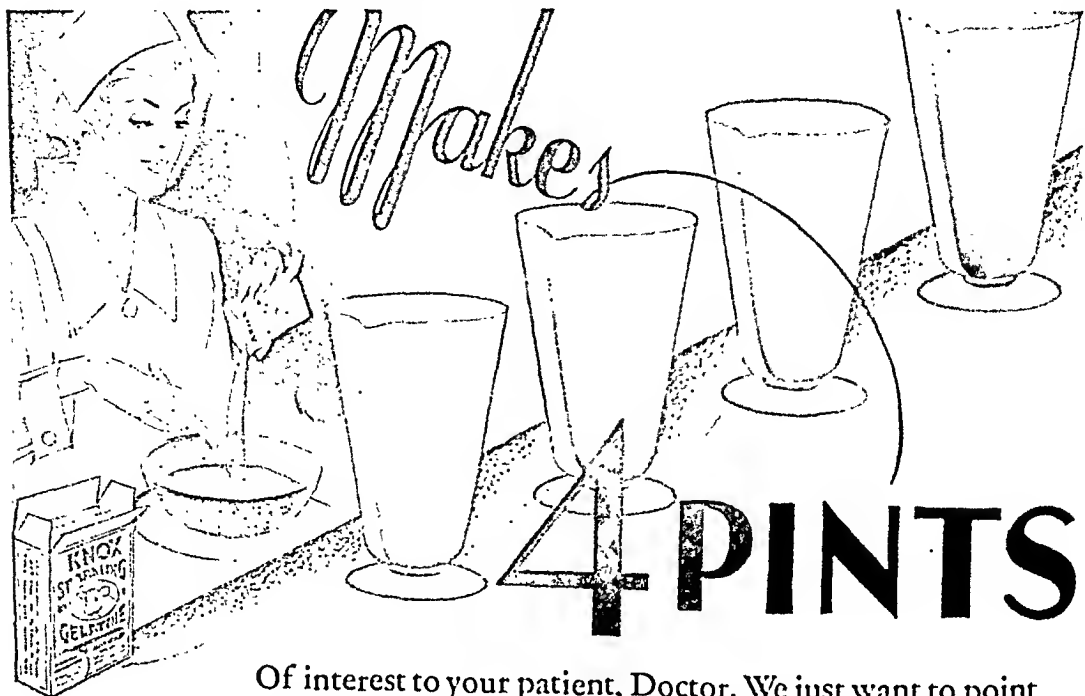
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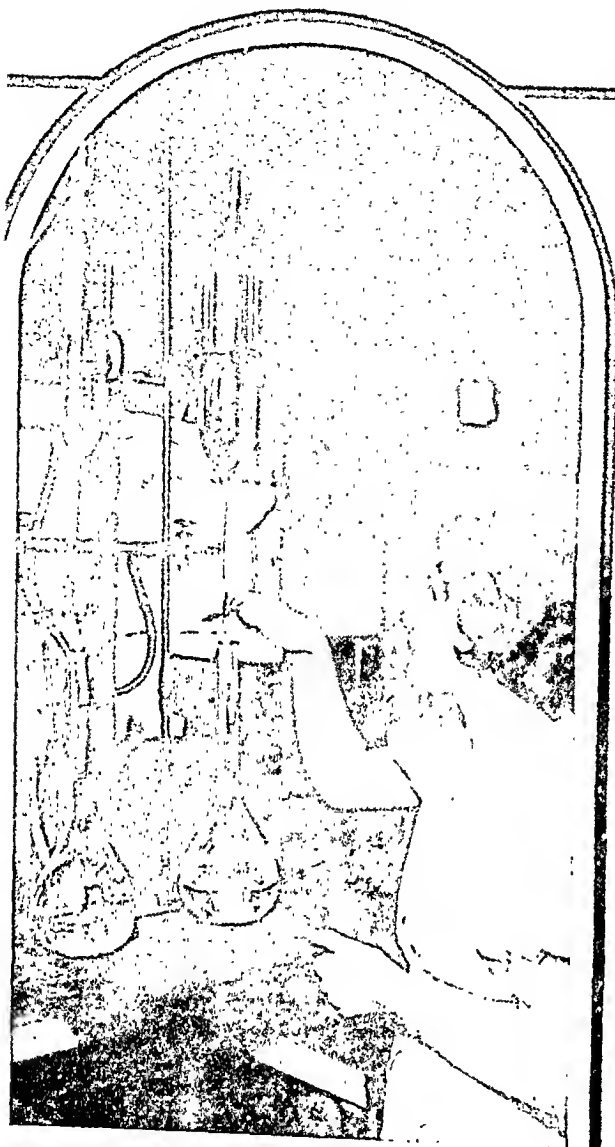
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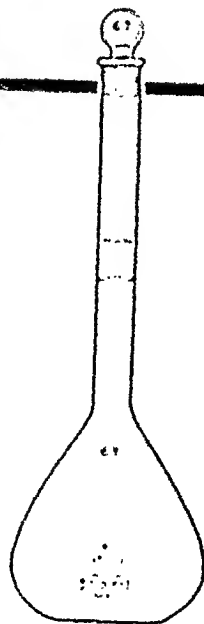
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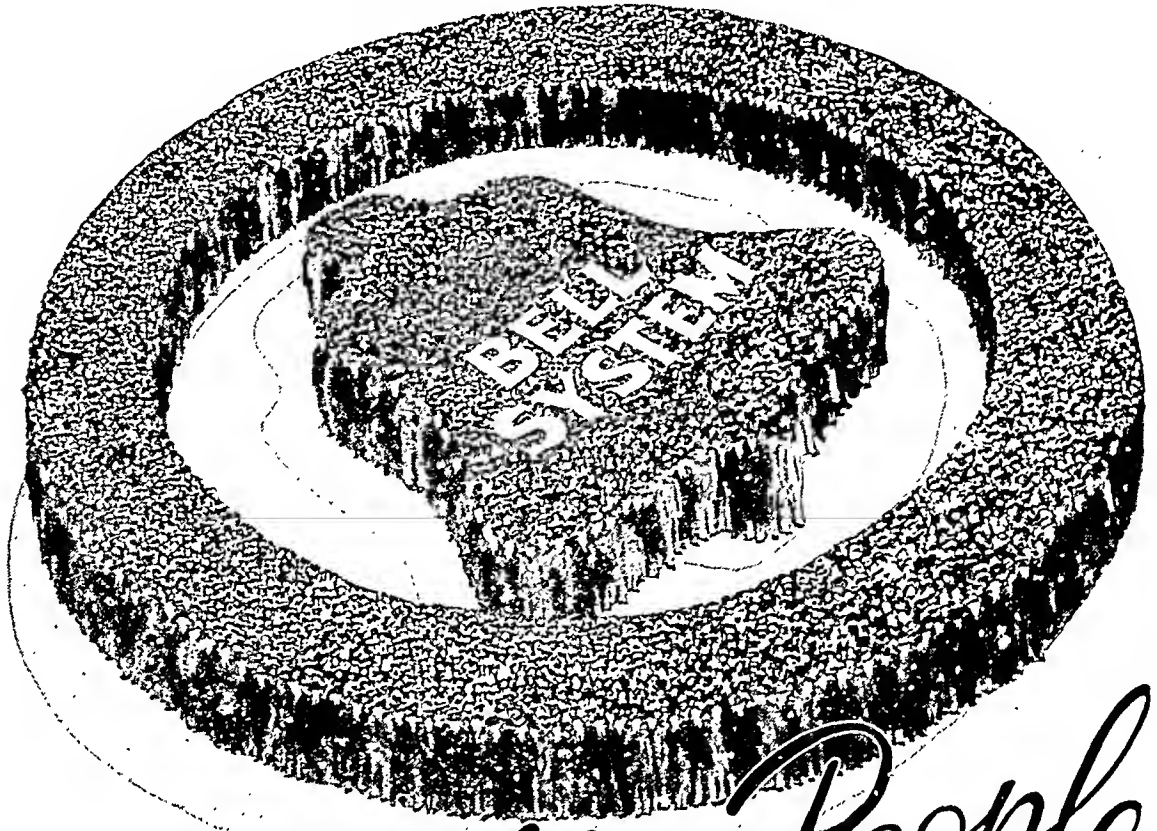
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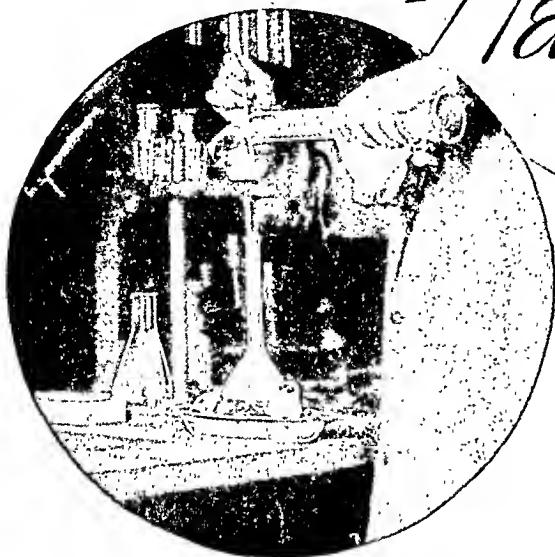
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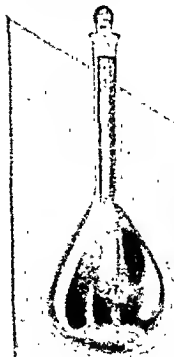
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LATENT AVITAMINOSIS:

THE "TWILIGHT ZONE" OF NUTRITION

Each passing year discloses that the science of medicine has made further application of the results of biochemical research. The time will come when the physician will rarely see examples of extreme human avitaminosis. The high vitamin requirements of infancy and childhood are clearly recognized; they are fulfilled by proper supplements to the diet. The cooperation of intelligent parents will certainly aid in decreasing the incidence of deficiency diseases of childhood.

The matter of the adult vitamin requirement has also received attention; the average individual understands his dietary needs, in a general way. As a result, if the pellagrin be excepted, the practitioner today seldom encounters *extreme* vitamin deprivation in his patients. The fight against vitamin deficiencies is changing in aspect; the problem now is to combat *suboptimal* rather than *subminimal* vitamin intake.

In 1920, Hess described the condition of subacute or "latent scurvy". Evidence since accumulated indicates that similar conditions may exist in respect to the other essential vitamins. This latent avitaminosis has been aptly termed the "twilight zone" of good nutrition (1).

Latent avitaminosis is a state of ill-health difficult to define; it may be characterized

by a vague, indefinite sense of ill-being; it is a condition, however, which responds to proper diet under medical supervision; and among the most valuable foods available for diets in cases of latent avitaminosis are canned foods. The literature is replete with articles relating to the vitamin values of canned foods; several of these are particularly pertinent to the present discussion (2).

Two species of laboratory animals, the albino rat and the guinea pig, were carried through ten and eight generations, respectively, on a diet which consisted entirely of combinations of canned foods. No additional vitamin supplements, such as are commonly employed in the breeding or rearing of such animals, were necessary. The varied canned food diet supplied all factors, vitamin or otherwise, for the successful fulfillment of the life cycle, namely growth, maintenance, reproduction and lactation.

The significance of these findings is obvious. The physician may prescribe a diet containing a wide variety of canned foods with the confidence that the combination will supply essential vitamins in amounts consistent with the amounts of the vitamins present in the raw materials from which the canned foods were prepared. Whether additional supplementation with specific vitamin-rich foods or concentrates is indicated, is properly a matter for medical determination.

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(1) J. Amer. Med. Assn. 101, 127 (1933)

(2) Ind. Eng. Chem. 23, 1064 (1931)
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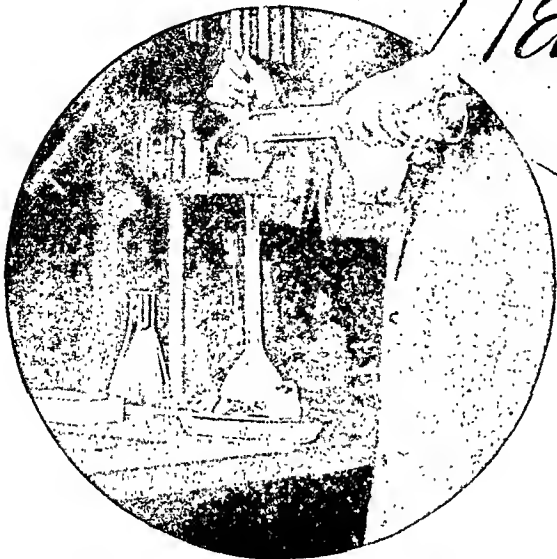
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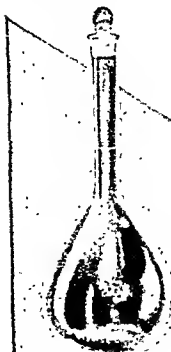
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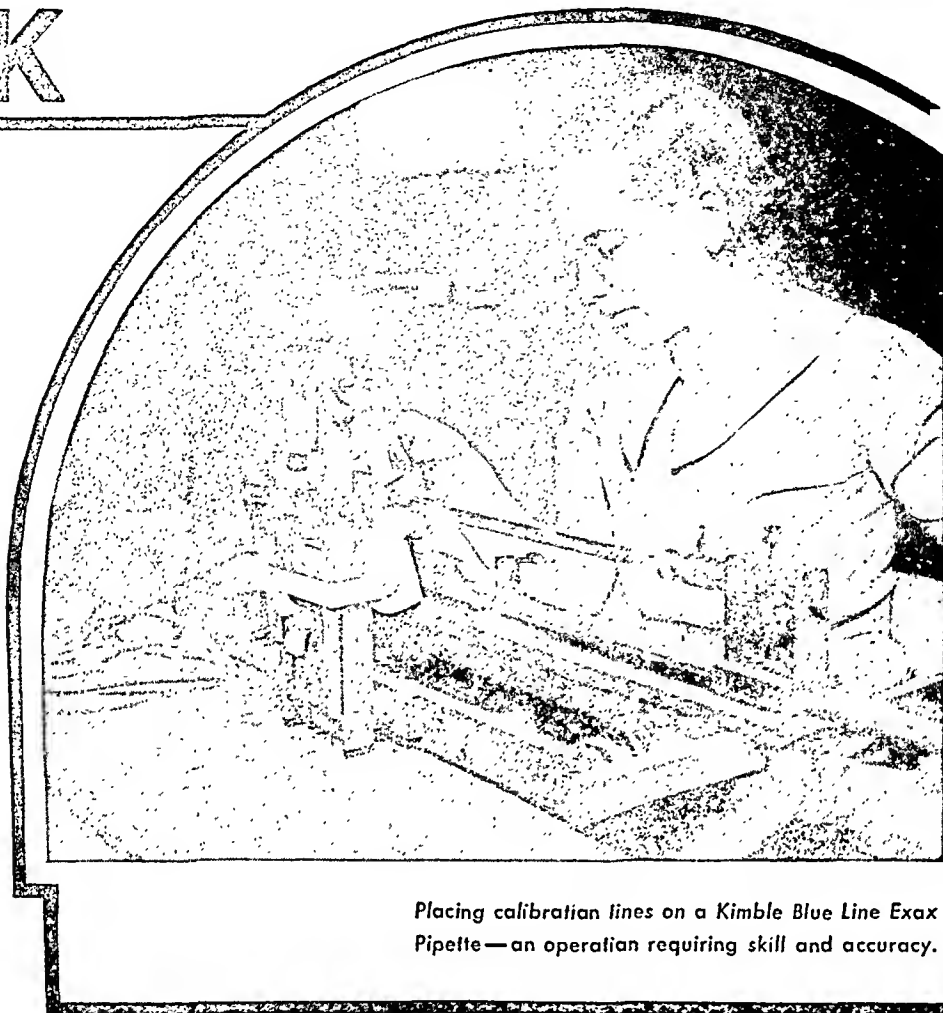
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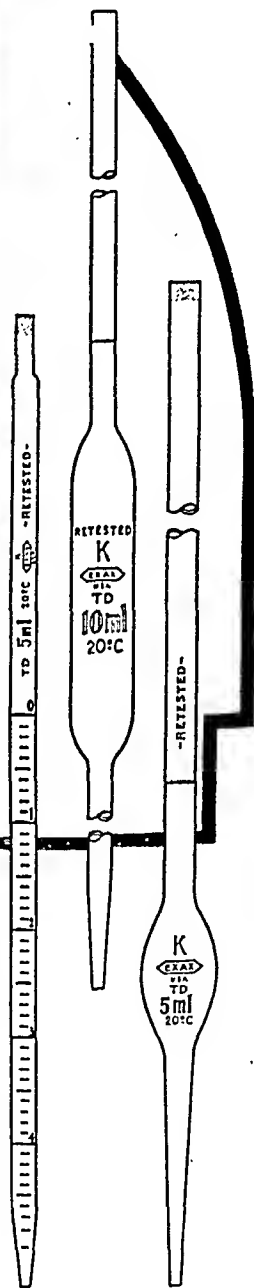
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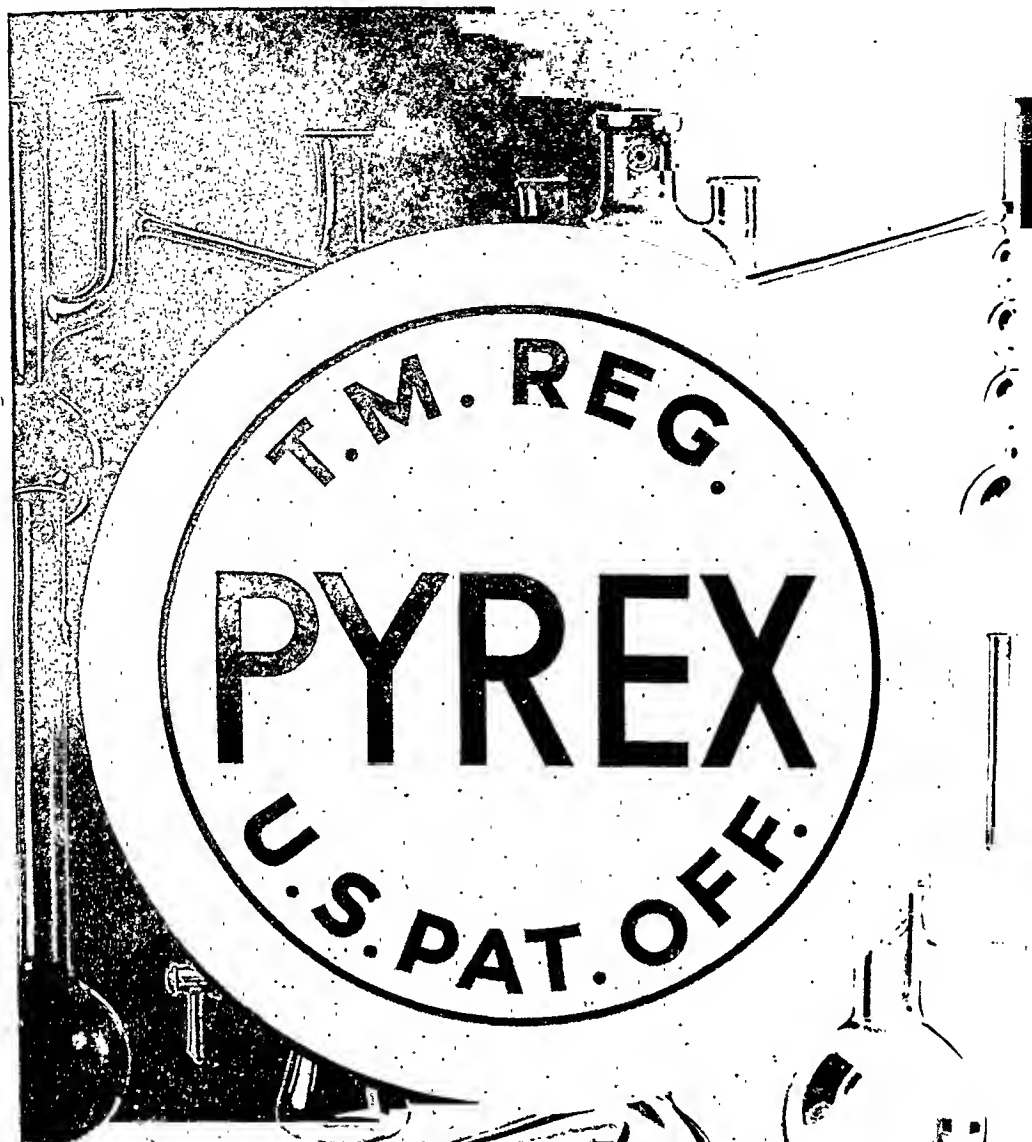
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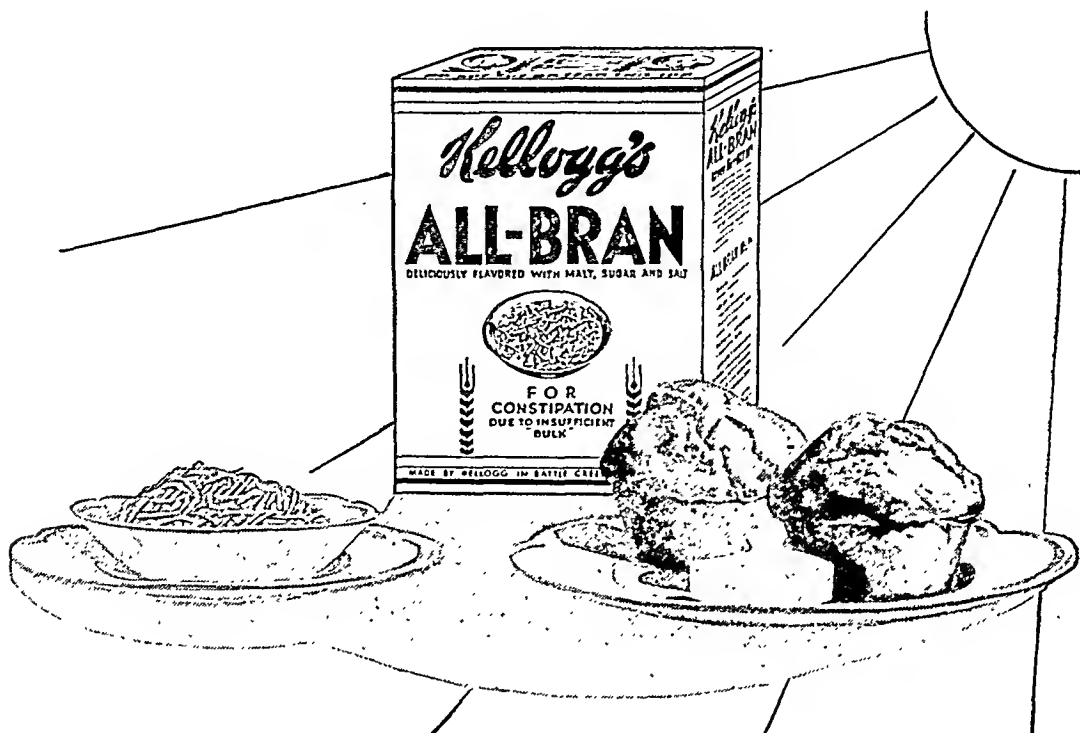
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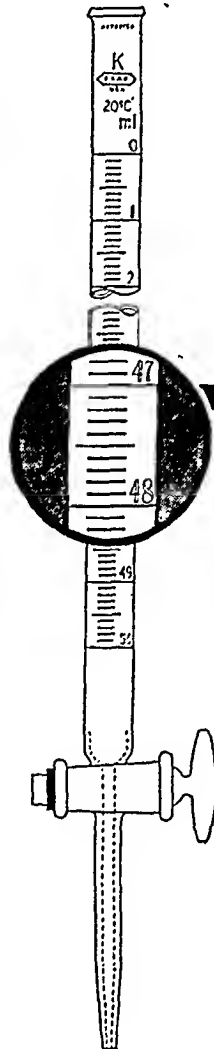
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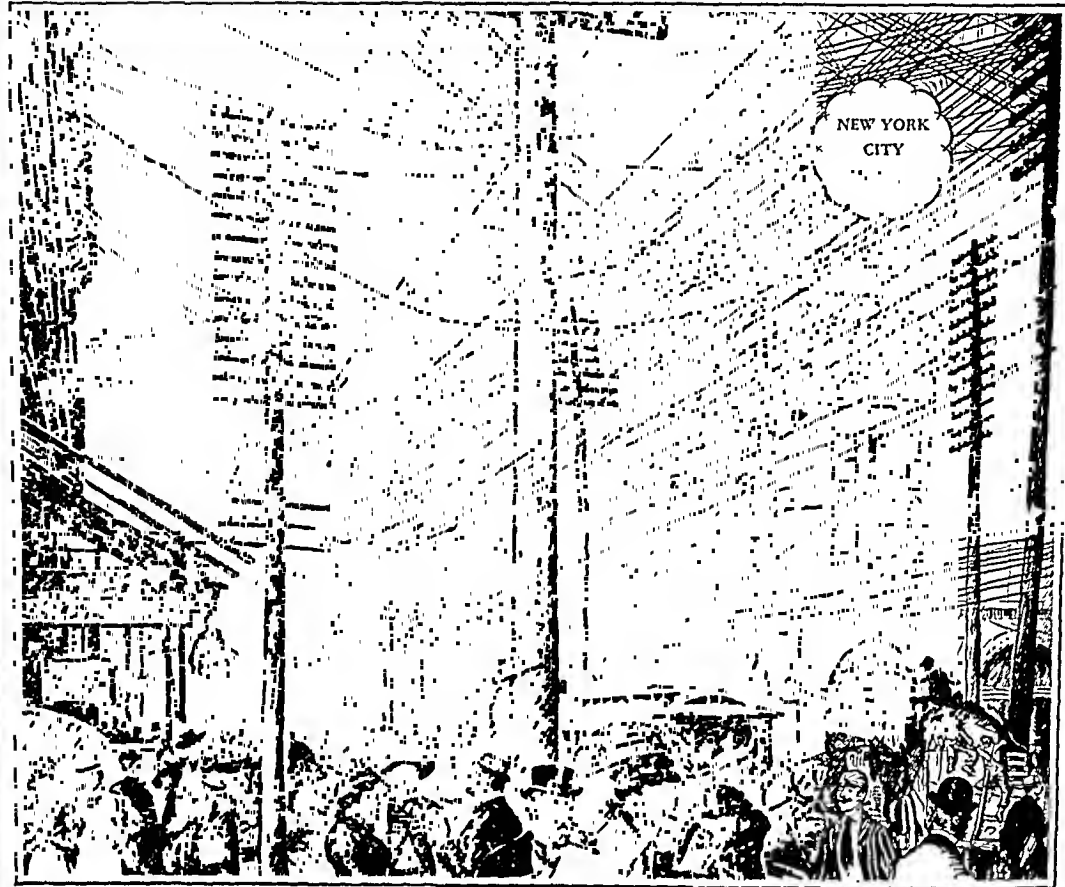
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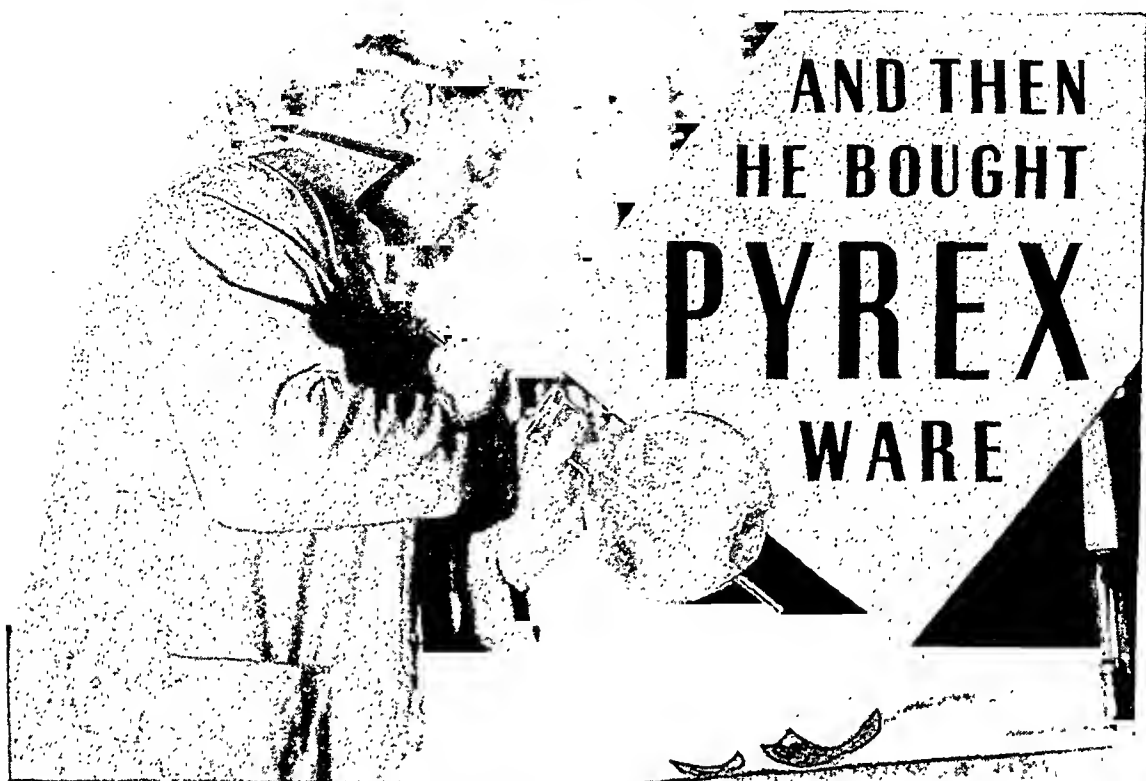
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Published by the American Public Health Association, 374 Broadway, Albany, N. Y.
Executive Office, 50 West 50th Street, New York, N. Y.

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Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, Mazýck P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 50 West 50th Street, New York, N. Y.

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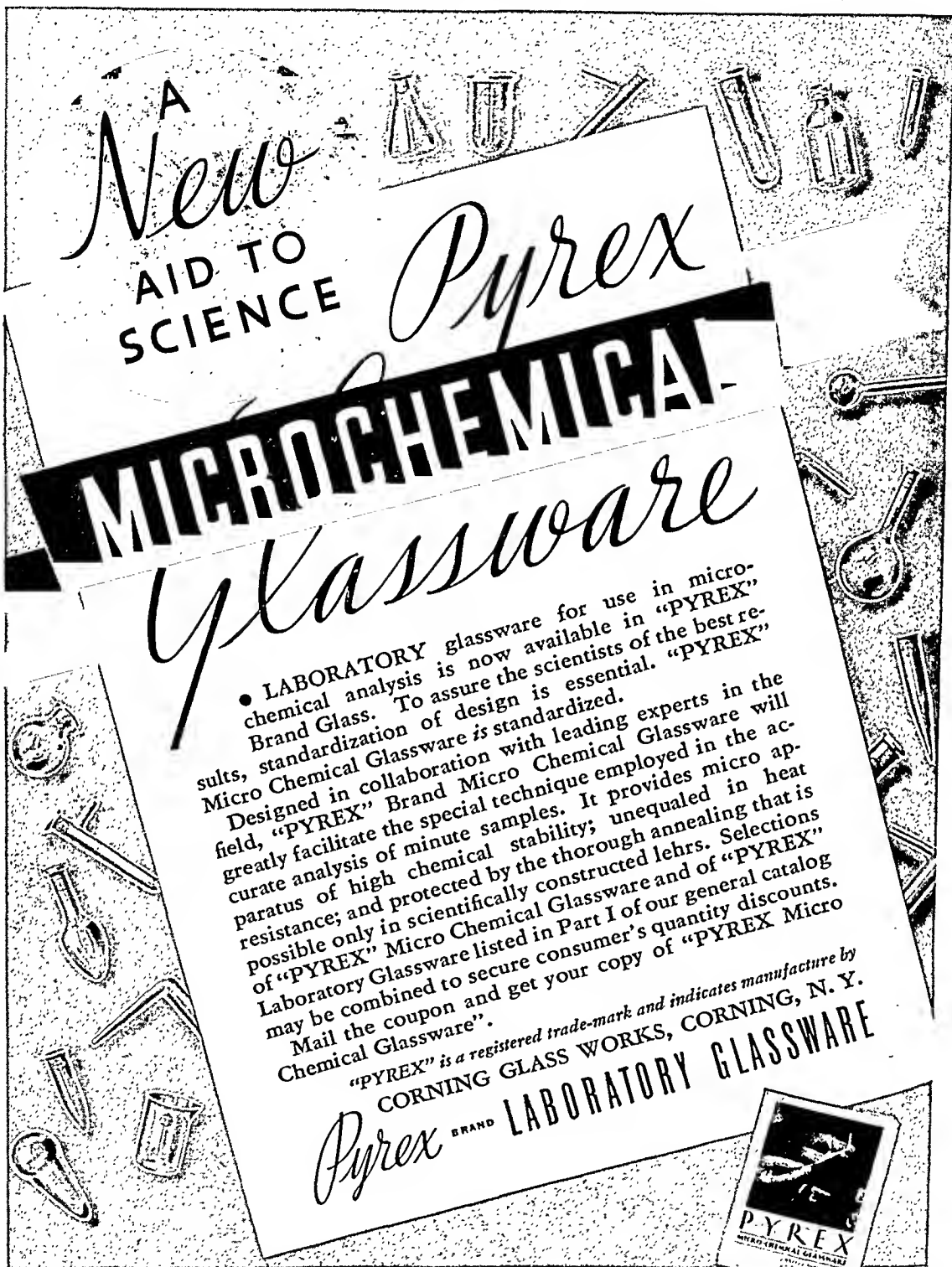
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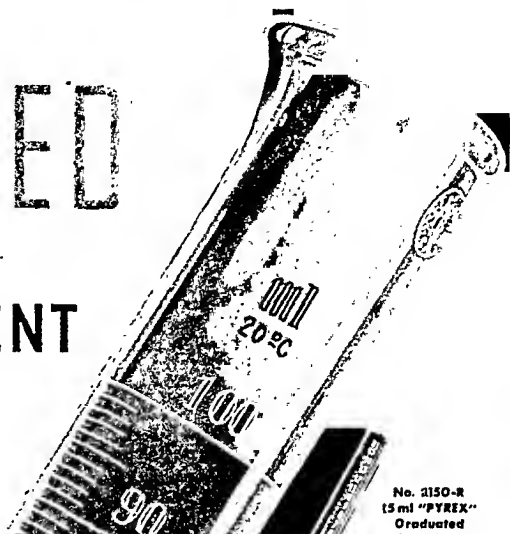
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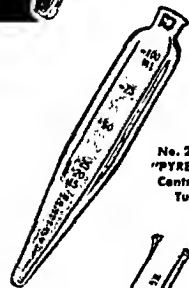
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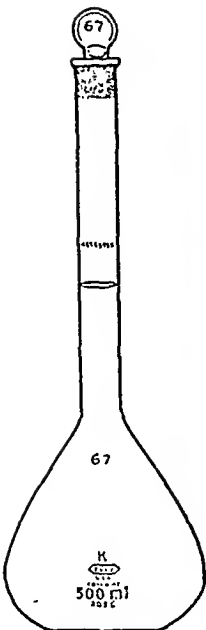
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American Journal of Public Health and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 25

December, 1935

Number 12

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Published by the American Public Health Association, 374 Broadway, Albany, N. Y.
Executive Office, 50 West 50th Street, New York, N. Y.

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Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, Mazzyck P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 50 West 50th Street, New York, N. Y.

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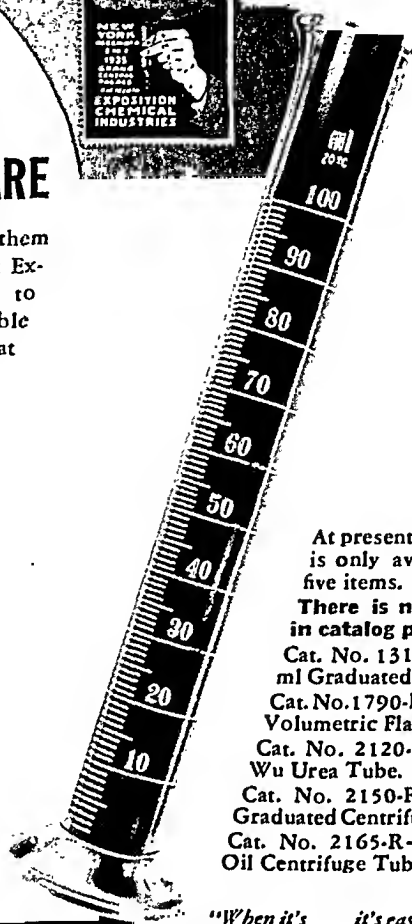
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American Journal of Public Health and THE NATION'S HEALTH

Volume 25

January, 1935

Number 1

Concern of the United States with Tropical Diseases*

F. W. O'CONNOR, M.R.C.S.

*Department of Medicine, Presbyterian Hospital, Columbia University,
New York, N. Y.*

OUR responsibility regarding tropical diseases requires consideration of various factors. Of primary interest to us are the diseases of the mainland, but we must also consider those of our various dependencies and protectorates, and of the army and the navy whose members may serve in any part of the world. We have, furthermore, a measure of responsibility for the many commercial enterprises having branches in foreign countries and for the engineering, scientific, and missionary organizations whose work is largely carried on in foreign fields. Viewing the matter from this broad standpoint it will be readily appreciated that our concern with tropical and imported diseases is national.

Most of us know that the diseases referred to have played an important part in the development of this country from its earliest days, and it is therefore desirable to review this aspect of the subject. Many of these diseases are still of serious importance to us, and we have to consider their possible influence

on the future of the people as well as our ability to control them.

According to the earliest records the first white settlers found this a healthy country, and there is no suggestion that they were affected by tropical diseases on their arrival. This happy state, however, was of short duration, and we learn of malaria having been introduced by the Spaniards at an early date. With the establishment of the slave trade the African brought not only this infection but many others. Those infections which required no intermediary host for transmission, such as hookworm, ascaris, etc., as well as those which found a suitable insect host, for instance the virus of yellow fever, the plasmodia of malaria and *Wuchereria bancrofti*, established themselves on the mainland. On the other hand the trypanosoma, schistosoma, loa loa, as well as other less important parasites, in the absence of a suitable host, could not spread in North America. *Malaria* spread rapidly and Rush tells us that remittent and intermittent fevers were responsible for a high mortality and much invalidism. In some localities he found that scarcely a family, and in some families scarcely a

* Read at a General Session of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

member, escaped the disease. Later, in his lecture courses Hosack considered malaria so important that he devoted 3 lectures to this subject alone. La Roche in 1855 stressed the prevalence of the infection on the outskirts of developing settlements. During the Civil War Woodward states that there were 1,213,685 cases of malaria with 12,199 deaths among the Northern troops, and adds that it was even more prevalent among the Confederates. Vaughan, in writing about his experiences in 1865 says, "Every man, woman and child in southern Illinois, at least within my range, shook with ague every other day"; and later, "That summer I saw enough of a people held in bondage with malaria to make a lasting impression on a boy's mind."

Hirsh in 1883 found that the largest foci of infection in the United States were on the shores of the Great Lakes and particularly in the southern part of Michigan. He reports pernicious attacks of the disease at Detroit and Plymouth, and as far north as Hamilton and Kingston, in Canada. It was then endemic in the northeastern part of New York, but he adds, "It is mostly along the banks of the Hudson and on a narrow strip of coast that the disease is endemic in this state." According to Ferrell, in 1881 the death rate from malaria amounted to 4.2 per 10,000 of population, and only in 1890 did the mortality fall below 1 per 10,000 in New York State. Not until 1898 was the mortality less than 1 per 10,000 in New Jersey; and in Indiana the rate was 1 per 10,000 prior to 1900.

Yellow fever appeared first in Boston in 1692, introduced from the West Indies. In 1699, only 17 years after the founding of the city, it spread havoc in Philadelphia. From that time until 1853 in cities ranging from Providence, Rhode Island, to New Orleans, La., epidemics of varying severity caused high mortality. Subsequently smaller out-

breaks occurred at Decatur, Ala., and elsewhere, but with the exception of a few laboratory infections the disease has not appeared in this country within recent years. Philadelphia especially suffered during the epidemics. From Philadelphia physicians of that time we have excellent accounts of the disease as well as references to the outbreaks of malaria and dysentery which usually preceded the epidemics.

Dysentery is frequently described by the early American writers. Both febrile (bacillary) and afebrile (probably amebic) are mentioned. Woodward's figures for acute and chronic diarrhea and dysentery for the Civil War period are 1,739,135 cases with 44,558 deaths. This writer gives good accounts of hepatic abscess, which, single or multiple, was found in 1 out of 25 autopsies of diarrheal or dysenteric cases. This disease was not limited to armies, for Vaughan tells us that "the most fatal childhood disease is designated in the family records as 'bloody flux' . . . It is a bacterial dysentery and in some generations has killed half of the family, mostly before they reached 5 years of age." Large or small outbreaks of bacillary dysentery have occurred in different states since the time Vaughan refers to and within the last 6 weeks we have heard of its presence in Jersey City, New York, and Boston.

Cholera—Three severe visitations of cholera have reached the United States. In 1832 the infection having entered through Canada spread to Detroit, New York, Pennsylvania, Maryland, Virginia, and Kentucky and along the Ohio River to Indiana and Illinois. In October of that year it was severe in New Orleans whence it spread along the Mississippi. In 1848 cholera started in this country at New York and New Orleans. From the latter city it reached Memphis and Texas. In 1849 it spread over the whole of the country

east of the Rocky Mountains and in 1850 it was widespread in the far west and in the basins of the Mississippi and Ohio Rivers. Cases of cholera were present in certain parts of the country until 1854. The last serious epidemic of this disease arrived from Halifax in 1866. It appeared in New York and New Orleans and spread throughout the country with the exception of the states along the Atlantic seaboard.

Dengue has appeared frequently in this country and is endemic in certain areas of the South. The first epidemic of which we have a fairly clear account was described by Rush in 1780. There was a widespread epidemic in the South in 1850 and another in 1924 which spread from Texas to North Carolina. In the last available *Public Health Reports* cases of dengue are reported for 1931 and 1932, and only a month ago an outbreak of some local importance was reported in Miami, Fla.

Relapsing fever was brought to this country at an early date by immigrants from Europe. According to Craig it was first recognized in the United States in 1846. Parry mentions the disease as being present in New York and Philadelphia, and describes an outbreak in the latter in the winter of 1869-1870, when he had 37 cases in his own practice. The disease has since been reported in different parts of the United States and Canada. Most of the earliest outbreaks were probably transmitted by lice. Recently the disease has been found to be endemic in Texas and California, where the transmitting agent is believed to be a tick, belonging to the genus *Ornithodoros*.

Leprosy was introduced both from Europe and from Africa. It was not uncommon in the Mississippi Valley 150 years ago (Denny). In 1872 it was found to be spreading among persons of French descent in the South, and an endemic area exists on the coast of Texas northeast of Galveston.

Undulant fever was first recognized by Musser and Sailer in 1898, although in all probability it had been here for a long time. Those who have worked on this disease since, feel that possibly the epidemic of typhomalaria in 1880, as described by Hoff, was undulant fever. Craig saw many cases in the army in 1904. In 1918 it was found that *Brucella abortus* was frequently present in cows' milk in the San Francisco region. In 1922 there was a severe epidemic of this disease in Phoenix, Ariz. In the last available *Public Health Reports* 1,578 cases were reported for 1931 and 1,502 for 1932.

Doubtless many of the other tropical diseases with which we are familiar existed from the early settlement of the country but they were not understood. From historical record therefore we learn that tropical diseases were a serious menace to the pioneers of this country during its early development, and that most of these diseases were imported. Most important among the lessons of this experience is the fact that with economic improvement in a people's condition and with the increasingly efficient public health service which such improvement renders possible, most of the diseases, called tropical, may be kept within the limits of their more usual climatic zones.

While we may reasonably hope that epidemics of the more destructive tropical diseases, such as cholera, yellow fever, and plague, are unlikely to afflict us in the future, there are abundant reasons why we should take thought of the many others which still exist in this country.

Strangely enough, at the present time there is a greater variety of so-called tropical diseases in the United States, and a higher incidence of some of them, than is found in the European countries where the same diseases are indigenous. The most important contributing factor is the vastness of this

country, which includes a sub-arctic, a temperate, and a sub-tropical climate. The varying topography of the different states also exercises an influence. Furthermore there are no sea barriers between the tropics and the temperate zone as there are in Europe. Such barriers have undoubtedly prevented the spread of certain infections there, whereas we have none between Mexico, Central America, the southern states, and the remainder of North America. We have also a constant influx of our own citizens from Puerto Rico on the east coast and from the Philippines on the West Coast, in addition to which there is a large immigrant population from the Caribbean Islands, Central and South America, which settles primarily in the large cities of the Atlantic seaboard bringing their parasites with them. I know nothing of the incidence of animal parasites among the resident population of Orientals on the west coast but, judging from experience in New York with Chinese clinic patients, the incidence of hookworm, ascaris, whip worm, and the Oriental liver flukes must be fairly high. Due to our extensive coastline, with some ports in the sub-tropical zone, many persons from the nearby tropics come to this country on business or for study or medical consultation. As a result of these different factors we find in the large cities a variety of parasitic and tropical conditions which is unique for a more or less temperate climate. While it may be said that within this country everything possible is being done to combat the more serious tropical diseases, we should consider whether we are not neglecting the dangers of some imported infections. A fair percentage of the immigrants or citizens who come to our large ports eventually settle in rural districts where sanitation is as primitive as in their country of origin. One wonders if it would not be well to include in the medical examina-

tion which is given to immigrant aliens on entry, at least one stool and blood examination, to obviate as far as possible the likelihood of their supplementing the parasitic conditions already found in the United States and Canada which it is our object to suppress.

While it is impossible to classify these infections according to their geographical limits in the states, it is possible to place them in categories according to their prevalence. Thus undulant fever, the intestinal protozoa, trichiniasis, *T. echinococcus*, *T. saginata*, *Enterobius vermicularis*, and some skin infections, and snake bite (except in Maine), may be found fairly frequently, or may occur in sporadic instances in most states of the Union. On the other hand, malaria, blackwater fever, hookworm, pellagra, ascaris infection, leprosy, relapsing fever, dengue, granuloma inguinale, climatic bubo, endemic typhus or Brill's disease, hymenolepsis nana infection, creeping eruption, filariasis (limited to Charleston, S. C.), and rarer conditions such as madura foot and ainhum, are more prevalent in, although not strictly limited to the southern states.

Diphyllobothrium latum infection has of recent years become increasingly common in the northern states. Many of the fish in the Great Lakes district are infected, and Magath has given us very valuable information on the subject. Five years ago *T. saginata* was the most commonly encountered tapeworm at the Presbyterian Hospital, New York, whereas now it is outnumbered by the fish tapeworm. It is of interest to note that in our experience most of these infections occur in the female members of orthodox Jewish families. These people are the largest consumers of the fish which is shipped from the Great Lakes district.

While the majority of these conditions considered separately are not definitely of public health importance, collectively they are responsible for a

considerable degree of invalidism. Of particular importance, however, we may consider malaria, hookworm infection, pellagra, amebiasis, leprosy, and undulant fever, while relapsing fever and ascaris infection merit our attention as being potential menaces in certain areas.

Malaria continues to be a serious public health problem. The economic loss resulting from its effects is an important factor. Children are retarded both in their mental and physical development. Ferrell has shown that in 1919, 1920, and 1921, 520 counties in 16 states reported a mortality rate from malaria of more than 1 per 10,000 inhabitants. The percentage of counties in the respective states having a significant problem varied from 5 per cent in Kentucky to 90 in Mississippi, and the proportion of the states' population included in such counties ranged from 1 per cent in California to 92 in Mississippi. In Arkansas, Florida, Louisiana, and Mississippi, approximately three-fourths of the population live in counties having a malaria problem. In 1932 there were 68,613 reported cases of malaria from 37 states, with 2,625 deaths.

Considerable research has been devoted to the prevention of this infection. Where drainage is possible it is most efficacious. Filling in, as employed in land reclamation, has done much to limit its prevalence. Certain species of larvacidal fish have been found useful in some districts. Oiling of breeding waters has its advocates, and various chemicals have been used with some success. Of recent years a definite advance in the prevention of malaria has been made by treating the breeding places of anophelines with Paris green. In smaller collections of water the chemical may be disseminated by hand; in larger areas it is distributed by airplane. In many places where other measures are not practicable the

mosquito proofing of houses has proved efficacious. In all malarial areas the people should be advised when possible to use mosquito nets. Sometimes a combination of several of the methods mentioned may be necessary. The use of quinine as a prophylactic has been shown to be useless, but the sterilization of carriers of gametocytes with plasmochin may help to prevent infection of their fellows.

Medical officers of health should have special knowledge of the prevention of malaria along the lines referred to, and this necessitates a preliminary knowledge of the differentiation of mosquito genera and the morphology of eggs, larvae and adults of the anophelines which are the carriers of the plasmodia. It is important to recognize the kinds of water in which such anophelines breed. This varies in different localities. Some species breed in stagnant waters; others by the side of streams; some require the freshest water; others tolerate a fair degree of salinity.

Hookworm is a disease which has only been understood within comparatively recent times. In heavily infected persons it causes severe anemia and debility. The effects on children of school age are very apparent, for it produces stunting of growth and retardation of mental development. Valuable work has been done in this country on worm and egg counts, from which we have an index of the number of worms necessary to cause hookworm disease. However, it must be remembered that when associated with other infections such as tuberculosis, malaria, pellagra or amebiasis, much smaller numbers of hookworms may play a serious rôle in aggravating the severity of symptoms or retarding convalescence after any intercurrent sickness. Considerable progress has been made in combating the disease by means of education, sanitation, and by massed treatment. Jacocks describes hookworm surveys in

11 southern states in 1910-1915 and resurveys of the same areas in 1920-1923 following an active treatment campaign. In the original survey he found 51.1 per cent of the rural school children infected, whereas in the second, he found only 27.8 per cent, a reduction of 49.5 per cent. He points out that the reduction of the severity of the disease was probably much greater even than the figures would indicate. In Mississippi, Keller, Leathers, and Ricks, by massed treatment have reduced the infection 62 per cent in the period from 1910 to 1933. From these brilliant results states and counties with a hookworm problem have abundant assurance that if they carry out control measures on the lines that have been proved to be successful they may rid their population of this incapacitating infection, or at least reduce its incidence to that of negligible importance.

Pellagra—Since many cases of the food deficiency disease, pellagra, remain undiagnosed, it is probable that during any year the figures given for this disease are well below the fact, although the reported figures are sufficiently serious. It causes debility, anemia, gastrointestinal disturbances and insanity, and has a high mortality. Pellagra is so often associated with hookworm infection that the gastrointestinal symptoms are frequently attributed to the latter. This is certainly not the case since pellagra occurs with the same symptomatology in countries where hookworm does not exist, but, nevertheless, as a contributing factor hookworm infestation must be considered. It is significant that pellagra is especially prevalent and severe in those countries where there is a high incidence of hookworm, namely, in Egypt, and in our own southern states. The disease becomes more prevalent during periods of special privation. Goldberger's inquiries concerning pellagra in Tennessee, Arkansas, Mississippi, and Louisiana show that in

1924 there were 20,000 cases with 1,026 deaths, whereas in 1927, after the flood and its attendant want and privation, he estimated that there were 50,000 cases with 2,500 deaths. According to the last available *Public Health Reports* there were 15,643 cases in 19 states during 1932. The control of this scourge is largely dependent upon improvement in the economic condition of the people and upon their education along dietary lines.

Plague—With the exception of small outbreaks in Louisiana and California, plague has not assumed dangerous proportions in this country. The infection is indigenous among desert rodents in some parts of California, Montana, and Nevada, and cases of rodent plague are sometimes found about ports. From experience in India and other countries it is known that an increase in the incidence of rodent plague usually precedes the appearance of the first human cases; therefore, it is only by constant observation of rodent plague incidence that the disease can be prevented from appearing in epidemic form among human beings. That we have been protected against such visitations in this country is entirely due to the vigilance and efficiency of the health authorities.

Amebiasis—It is now generally recognized that amebiasis with its destructive complications is not limited to the tropics. The usual methods of transmission by flies and water from contaminated streams and wells are such that man probably gets only a small infection at one time. He is thus able to build up some immunity so that with the onset of the disease the symptoms are usually insidious or mild. For this reason also the disease has been known as an endemic one. However the recent epidemic in Chicago indicates that we must modify our original conception of the transmission of this disease, and that in this, as in typhoid and bacillary dysentery, the very effort toward the

better sanitary protection of mankind may not only bring new evils in its train, but may also upset the usual biological balance between parasite and man. Epidemiological evidence suggested, and the sanitary engineers have demonstrated, that this epidemic was caused by the massed contamination of potable water with sewage containing *E. histolytica* cysts, mainly in 2 hotels. As a consequence, many persons with no acquired immunity became heavily infected and probably reinfected within a short space of time, with the most serious consequences. It is at least probable that the contaminating agency was associated with infringements of established rules and laws regarding cross-connections. In the past we have had outbreaks of bacillary dysentery due to contamination of water resulting from cross-connections and faulty plumbing, and since we now have evidence of another disease being transmitted in the same way, it is most important that inspection of our hotel and residence water systems should be carefully and systematically undertaken by properly qualified sanitary inspectors. The Chicago epidemic of 1933 is a warning to all municipalities and health officers that under conditions of "guest strain" during conferences, expositions, pilgrimages, etc., another such epidemic might easily occur in any large city. *Entamoeba histolytica* cysts exist in 5 to 10 per cent of the population. Each infected individual is in danger, should his physiological balance break down, and he is an especial menace to his fellows under conditions such as existed in Chicago. Health authorities should be alert to the significance of this infection, especially when it is known that several members of a family or small groups of persons in limited localities are infected. The Chicago epidemic also showed the limitations of physicians in recognizing the condition.

From personal experience it is also

clear that the clinical knowledge of physicians is equally limited concerning other grave diseases, which though more common in the tropics are fairly prevalent among us. Therefore, while it does not seem indicated to add to the already crowded curriculum of the medical student, he should be advised to have a reading knowledge of most tropical diseases, and more emphasis should be given in his medical course to malaria, hookworm, amebiasis, and undulant fever in their clinical and laboratory aspects. This is even more necessary for the medical student of the South.

For physicians desirous of becoming medical officers of health much more knowledge is required in this branch of medicine, especially regarding insect-borne diseases and the large group disseminated by fecal contamination. With regard to the former he should not only be able to recognize the insects themselves but should understand the bionomics, the methods by which they become infected from man, and the duration and nature of the development of parasites within them under varying climatic conditions. For those conditions transmitted through feces further knowledge is necessary, such as the conditions under which embryos develop inside the egg, whether they remain in the egg, or, if they hatch, to what extent the surrounding soil may become contaminated, the methods of infection of man for each parasite, the conditions by which flies act as porters of parasites, and the various ways by which water may be contaminated in wells, streams, and from reservoirs to water mains in buildings.

A knowledge of general measures known to be effective in the prevention of parasitic diseases transmitted by fecal contamination is also of importance. *Enterobius vermicularis* or pin-worm, ascaris, and the tapeworm, *Hymenolepis nana*, are directly trans-

mitted from material contaminated with feces by the fingers to the mouth. Hookworm larvae hatching from the egg on the ground enter the skin of the feet, hands or buttocks when in contact with them. The intestinal protozoa are transmitted by flies or by the water of wells or streams which have been contaminated by feces. The essential points in the prevention of all these infections is the education, especially of children in schools, to the dangers of such methods of infection, and of the vital necessity of personal cleanliness following defecation and the proper disposal of excreta within the limits of economic ability. Regarding towns and cities, the sanitary inspection of reservoirs and other water supplies at their source is not enough; a rigid inspection all the way from the source to the consumer is most important.

Leprosy is a public health problem in every country where it occurs. It was probably more prevalent in this country formerly than it is at present, but even now as the official figures show it is fairly common in the southern states. Happily, owing to the more humane method of caring for lepers, there is less tendency on the part of these unfortunates to try to hide their condition, and the danger of spreading this disease is proportionately limited. In the South the lepers are willing to avail themselves of the help offered them at the Federal Leper Colony in Louisiana. The concern of the United States with leprosy is of great importance in her colonies. The institutions for lepers in this country, in the Philippines, in Hawaii, and in Puerto Rico, and the Leonard Wood Memorial have earned a world-wide reputation for their work on the control and treatment of this disease.

Experience in our clinic suggests that there is a high incidence of infestation with the round worm, *Ascaris lumbricoides*, in this country. It is therefore

interesting to learn from Cort and Otto that no endemic centers of this infestation of public health importance are reported from the northern and western parts of the country. The real problem is among the indigenous population of the Appalachian Mountains and the foothills running south, east, and west from this range, especially in Kentucky where the incidence is highest. Outside the mountain area important foci were found in Columbus County, N. C., in south central Louisiana, and in the city of Tampa, Fla. At the last the incidence is highest among the Cubans and their American born children. It is interesting to note in this connection that Boeck and Stiles found 21.9 per cent of 196 newly arrived immigrants, mainly from southern Europe, infested with ascaris, and that Cort reported 2.5 per cent as positives in 507 Japanese laborers in the delta region of central California. In New York we have found several ascaris families among missionaries recently returned to this country.

Ascaris is notorious owing to the frequency of serious accidents due to its wanderings from its usual habitat, the small intestine of man, into various parts of the body, and to the obstructions which it may cause through numbers. Moreover it is commonly associated with a variety of gastrointestinal and nervous symptoms, while mental phenomena may sometimes occur. In children with heavy infestations mental and physical development may be retarded, and, following early after infestation, during the wanderings of the embryo through the lungs, symptoms varying from bronchitis to pneumonia may develop.

Infestation is direct by mouth owing to ingestion of ova containing embryos which have matured on the ground where feces have been deposited in damp, dark, and warm places. It is therefore most prevalent in sections where sanitation is primitive or absent. In such places children are liable to

defecate in the region of the doorway or porch. Children show a higher incidence than adults. Frequently whole families are infested and are known as ascaris families. They are a particular menace, and act as distributing foci to neighboring families and at such rural schools as have no sanitary facilities. Prevention of this infestation depends upon the installation of suitable privies, and the education of the people regarding ascaris, especially through the children at schools which are situated in areas of high incidence. Special attention should be paid to the treatment of ascaris families to prevent dissemination.

From clinical and pathological observations in New York it is clear that *T. echinococcus* or hydatid infection and trichiniasis are by no means uncommon in some parts of this country, but we neither have records of their incidence nor do we know how much of these infections are imported. It would be both important and of general interest to have information on these matters.

Tularemia and Rocky Mountain spotted fever have found their way into the textbooks on tropical medicine without reason. Psittacosis has caused some interest of late, and has given us some reason for uneasiness. Happily the response to the need for research and prompt measures of prevention with education of the public have done much to prevent the spread of this disease.

The scientific contributions of our forebears and contemporaries give some indication of the importance of tropical disease to this continent. Significant as have been discoveries in medicine in other fields, in none of them has the output been so large on the one hand and so beneficial to all peoples on the other. The record is a splendid one and would provide abundant material for a volume on the history of tropical medicine in North America. On such an occasion as this, only mention of the

most outstanding achievement is possible, such as the Army Commission headed by Reed on the transmission of yellow fever, Gorgas's control of yellow fever in Cuba, and of both malaria and yellow fever in Panama, making possible the construction of the Panama Canal, Ashford's investigations on hookworm, Goldberger's work on the etiology and prevention of pellagra, a succession of brilliant contributions on amebiasis by Leidy, Walker, and Sellards, Musgrave and Clegg. Siler's work on the transmission of dengue, Vedder's on emetine and beri-beri, McCoy's on leprosy, and of McCoy and Francis on tularemia, and the many outstanding contributions by officers of the U. S. Public Health Service on undulant fever, leprosy, and pellagra. Much of the work on the culture of parasites originated in this country. Novy was pioneer in the culture of the leishmania, Bass was the first to culture the malaria parasite, and Boeck the first able to cultivate successfully the parasitic amebae of man. Noguchi's work on the leishmania, the spirochetes, and *Verruga peruviana* was not the least of that scientist's contributions. Flexner's contribution on bacillary dysentery, Brill's on endemic typhus, and that of Louise Pierce on tryparsamide are also outstanding. The manner in which the Rockefeller Foundation blazed the trail in the control of hookworm, malaria, and yellow fever will make an epic in medical history. The memory of many other discoveries too numerous to mention, though of great importance, will endure. Such a record fills us with admiration but it gives us no right to be content.

Unfortunately, time will not permit the discussion of many unmentioned phases in the field of tropical medicine, but I hope that I have shown that as tropical disease was of vital concern to the pioneers of this country, so now there are many reasons why we should be on our guard, due to the greater

proximity of the tropics resulting from the more rapid modern transportation by ships of the sea and air. At present there is no cause for alarm regarding the spread of these diseases, although we may well be warned by the recent Chicago outbreak of dysentery. Just as we have conquered some epidemic diseases, such as cholera and yellow fever, and have reduced the range and prevalence of others, such as malaria and hookworm, so in the future we may hope that serious tropical disease may become

less of a public health problem, while those who follow us may see some of these diseases banished from the land as we have seen yellow fever disappear from the member nations of this Association. This optimistic view presupposes that there will be no relaxation of vigilance or effort on the part of physicians and sanitarians, both in the research they may undertake and perhaps, most important of all, in the education of the public in the special health problems of tropical diseases.

Physical Examinations of Young Workers in Belgium

PHYSICAL examination of industrial workers under 18 in Belgium is the subject of a recent official report. Such examinations, introduced by a decree of 1920, are given at the time the young worker is admitted to work, and thereafter annually, and if the physician finds that the young worker's health is unsatisfactory, more frequently.

The employers are required by law to coöperate in this work; they must keep a register of all workers under 18, report to the physicians the names of new workers and of those who are frequently absent by reason of illness, and follow the recommendations made by the physicians with regard to workers whose health is unsatisfactory.

The examinations are performed either by medical inspectors employed by the government, or by private physicians paid by the employers and supervised by the medical inspectors. The results of the examinations are noted on individual cards, which are

kept either by the physician in his office or at the establishment. The information is not accessible even to the employer.

The young worker and his parents are informed about any condition that needs correction. No treatment is given by the examining physician, but the boy or girl is referred to the appropriate social welfare agency, where the necessary medical attention is given. The examining physicians with the aid of nurses and personnel workers are active in finding suitable work for those in need of special care.

During the 12 year period between 1921 and 1932 over 610,000 boys and girls were given examinations upon their admission to work in industrial establishments—all the larger establishments and some of the smaller ones; 9 per cent of these workers were found to have defects requiring additional examinations. — *Revue du Travail*, Brussels, No. 7, 1934.

Civil Works Administration Emergency Relief Administration Malaria Control Program in the South *

LOUIS L. WILLIAMS, JR., M.D.

Surgeon, U. S. Public Health Service, Washington, D. C.

IN the spring of 1933 the Federal Emergency Relief Administration was organized. Some of the state health departments immediately utilized relief labor on their malaria control projects. In October the Civil Works Administration was organized and announced that it was searching for worthy projects on which CWA laborers might be given gainful employment. The Public Health Service submitted to them a program for antimalaria drainage. This was enthusiastically incorporated in the CWA program and an organization for its administration was set up in November, actual work commencing in December, 1933.

On such short notice it was not possible to organize technical supervisory forces in 14 states, from resources within the state health departments, with which to direct the large number of laborers who must be put to work quickly. The Public Health Service was asked to supply this technical supervision for the drainage work and was given \$350,000 of PWA funds through the CWA.

The organization within each state consisted of a state director of malaria control to assist the state health officer;

district supervisors, whose number was based upon expected federal allotment of labor; and local supervisors. The federal allotment was greatly augmented, as nearly every state far exceeded the federal quota of drainage laborers. The assistant state directors and the district supervisors, working with and under the state boards of health, made surveys as rapidly as possible in order to find the most worthwhile projects; secured approval of projects; trained local foremen; received the labor and put it to work.

State records defining the malarious areas of each state, physicians' reports, hearsay evidence, and population densities, have defined the limits of each project. As was to be expected, there were frequent requests from influential landowners who sought free drainage where no particular malaria problem was involved. Fortunately, these were for the most part detected, and failed to get approval.

There were, in spite of the hurriedness of the entire relief organization, 14 assistant state directors with their 59 district supervisors, and 212 local supervisors, at work before the end of December. For nearly 4 months they supervised an average of 64,000 workers, the peak week accounting for 120,000 laborers. Nearly 6,000 miles of ditch were dug, draining 100,000 acres

* Read before the Third Annual Meeting of the Southern Branch A.P.H.A. in San Antonio, Tex., Nov. 13, 1934.

of pond and more than 200,000 acres of swamp, affecting an adjacent population estimated at 8,000,000 persons. As it was not known how long relief labor would be available, state and district supervisors were urged to secure a promise from local authorities that necessary maintenance would be financed should the relief be suddenly withdrawn. In addition, educational campaigns for the purpose of popularizing the work were initiated to insure its future maintenance. CWA work is at present being maintained in most instances, and probably will be as long as relief labor is forthcoming.

The CWA came to an abrupt close at the end of March, 1934; so the malaria control project was continued under the Emergency Relief Administration. The immediate change in policy stopped most of the drainage work and a number of weeks passed before its continuance was assured under the various state relief administrations. Before the end of May most of the states were continuing the work.

Under the ERA there were 15 assistant state directors with the number of district supervisors reduced to 50, and only 7 local supervisors. However, this policy change from a work project to a relief project with its slower growth led to better planning of each project and, in the main, work was better done than under the hurried CWA. To date nearly all CWA projects have been completed and most of the remainder will be finished before the end of December, 1934. This does not apply to a few very large projects which have been undertaken on the theory that relief labor (certainly in some places) will be available for 2, 3, or 4 years more. During the last 6 months of the Emergency Relief operations, approximately 2,000 miles of additional ditch have been dug, draining over 16,000 acres of ponds and somewhat more than 30,000 acres of swamp, affecting an adjacent popula-

tion of 2,000,000 persons. In places where drainage is not at present feasible some home screening projects have been undertaken. In a number of cases definite contract has been secured from local administrations that maintenance work will be locally financed when relief labor is no longer available.

The trend of malaria in the United States has been steadily downward for 70 or more years. The actual decline has fluctuated to some extent. The periodicity of its fluctuation, however, could not be accurately worked out, for usable records were not kept prior to 20 years ago. The records of the last 14 years show that the falling rate curve flattened out about 1919 with somewhat of a rise in 1920 and 1921, and then a resumption of the decline. The curve flattened out again in 1926 and showed a definite rise in 1927 and 1928, subsequently falling as before. The curve flattened out in 1932 and rose a little in 1933, and indications are that during the summer season of 1934 there has been a very sharp rise.

The decline in the malaria rate has been accompanied by a recession of the northern limit of the malaria territory; and also has shown a lessening of the virulence of the disease. Each rise in the rate has been accompanied by a reinvasion of a small portion of territory formerly malarious; by an increase in the virulence; and by local epidemics. The rise of 1934 indicates a rate higher than any during the last 20 years, for one or more definite epidemics of malaria have appeared during the fall in 7 states, 3 of which are states that have been at the northern limits of endemic malaria, and 1 of which has been entirely out of the malaria column for over 10 years. Also, the northern limit of malarious territory has moved north many miles and the virulence of the disease is greater than it has been for over 20 years. It is a matter of considerable interest and significance that the reports

so far available indicate that the increases in malaria have not occurred where Emergency Relief projects have been completed. It is not difficult to imagine the situation had not the hazard of malaria been removed from the bulk of the 10,000,000 people adjacent to these projects.

I do not mean to paint an ideal picture of perfect work perfectly carried out. Many projects during their inception were improperly planned by supervisors of limited experience and some even were constructed where work was unnecessary. Here and there ditches appeared that were almost impossible to maintain. However, most of these errors were corrected, and those few remaining are on the program for proper reconstruction. The estimates of our most experienced men in the field who have visited a large number of projects indicate that at least 90 per cent of the work has been good work and that, at a maximum, not over 10 per cent can be classed as poor. Lack of maintenance has created some new impoundings where loops of old streams, left open, have filled with backwater, or where uprooted trees have clogged main ditches. Some winter-dug ditches constructed by untrained personnel have very wide, flat bottoms. During the summer there has been insufficient water to maintain a continuous flow so ponds have appeared in territory

hitherto lacking in ponds. Here and there, particularly in the earlier ditching, there are large spoil banks too close to the edge of the ditches. Occasionally there can be found a ditch, through a swamp, with no laterals tapping deeper pools near the outer edges. These very errors were in themselves educational. The engineers and foremen, observing the operation of the poorly constructed ditches, seldom repeated the errors. These experiences have not only educated supervisors, engineers, and foremen, but also thousands of laborers throughout the South. This, in addition to the educational program, has gone a long way toward teaching the bulk of the population in the malarious areas to recognize good drainage and presages future control.

In addition to the drainage projects a blood index was taken to determine the endemic rate of malaria in the 15 states. To date, 129,000 slides have been examined. Unfortunately, the slides could be taken only while the CWA was in force and therefore were secured only in the winter and very early spring. At that part of the year the reservoir of malaria is at its lowest. The 129,000 slides show an infection rate of 5.8 per cent. This is divided into nearly 60 per cent benign tertian and 40 per cent estivo autumnal. There is a scattering of quartan—less than half of 1 per cent. In one state an in-

BLOOD INDEX—MARCH THROUGH MAY, 1934 *

State	No. Exam.	No. Pos.	% Pos.	B. T.	% B. T.	E. A.	% E. A.	Quar.	% Quar.	Mix.	% Mix.	Un-det.	% Un-det.
Arkansas	9,607	686	4.7	361	61.6	302	37.8	..	..	23	0.5	..	..
Florida	13,384	679	5.1	188	27.6	491	72.3	..	..	..	..	..	..
Georgia	27,005	1,136	4.2	632	55.7	423	37.2	29	2.6	6	0.5	46	4.0
Kentucky	4,794	344	7.2	105	30.5	237	68.9	..	..	2	0.58	..	..
Louisiana	9,377	600	6.4	321	53.5	270	45.0	1	0.16	8	1.3	..	..
Mississippi	19,172	1,156	6.0	590	51.0	551	47.7	2	0.18	13	1.1	..	..
Missouri	4,452	397	8.9	207	52.2	180	45.3	..	..	10	2.5	..	..
New Mexico	4,230	53	1.3	47	88.7	6	11.3	..	..	..	..	..	..
North Carolina	8,357	124	1.5	52	41.9	71	57.2	..	..	1	0.8	..	..
South Carolina	3,141	198	6.5	76	38.4	116	58.5	3	1.5	3	1.5	..	..
Texas	22,643	2,221	9.8	1,949	87.7	267	11.1	..	..	5	0.22	..	..
Virginia	2,770	11	0.39	11	100.0	..	..	..	..	..	..	..	..
Total	128,932	7,605	5.8	4,539	59.7	2,914	38.3	35	0.46	71	0.93	46	0.6

* Index report only of number of slides examined through October, 1934. Over 50,000 stained slides yet to be examined.

dex in the summer shows an infection rate among adults of 10 per cent. A number of localities experiencing severe malaria outbreaks recently have shown rates from 50 to 65 per cent. In our former studies fall rates of 18 per cent to 26 per cent have not been at all unusual. A number of such areas on recent resurvey have exceeded 30 per cent. The 10,000,000 persons adjacent to drainage projects were known to harbor malaria parasites at the rate of 5.8 per cent during the winter—what the rate would have been this fall without the control work it is impossible to say, but a conservative estimate places it at not less than three times that figure. At least one can say

that the benefits have been considerable.

If the present program can continue, the ultimate benefits to the South are incalculable. Maintenance of the work and extension into new territory is assured as long as ERA labor is available and is provided with adequate supervision. The Public Health Service has nearly exhausted the fund allocated to it for supervision, so if direction through the State Boards of Health is not forthcoming we may confidently expect to see ERA labor placed on other projects. The immediate concern of each southern state health department is to devise at once a workable plan that will assure continuation of expert supervision.

Effects of Depression on the Vision of Children

SCANT attention has been given in this country to the manifestations of disease of the eyes following long periods of dietary insufficiency and imbalance in a large group of our populace during the present depression. It has been assumed that though these diseases may be found in China, and were to be found in Germany during the war, this country has escaped them during the present depression.

Unfortunately, as a result of the long depression and consequently poverty, these diseases are beginning to appear in this country. Totally inadequate or imbalanced diets of the unemployed are beginning to exact their toll. Among the children of New York City, particularly in certain sections of the community, I have noted increasing incidence of pathology of the eye of this nature.

Disease of the eye due to diets deficient in vitamin A content is becoming far less rare than it used to be considered; I was almost impelled to say, are becoming fairly common. Xeroph-

themia of a mild form and hemeralopia (day-blindness) are not at all uncommon. I have noted that in quite a number of children proper refractive correction failed to give a satisfactory improvement of vision, in the absence of gross pathology; that vision findings with the same correction were better on dull and cloudy days than on bright, sunny days; and finally that placing these children in a dark room for 10 minutes to a half an hour resulted in a sharp rise in vision, and exposure to bright light caused a rapid drop in visual acuity. These cases rapidly respond to vitamin A therapy in the form of caritol, cod-liver oil, and a diet incorporating raw carrots, with a sharp rise in vision. Some of the more long-standing cases, however, present corneal changes which are less promising in prognosis for vision. Pigmentary changes are especially prominent in negro children. . . . E. M. Josephson, M.D. *The Eye, Ear, Nose and Throat Monthly*, Dec., 1934.

Report of Special School Health Studies in New York City*

DONALD B. ARMSTRONG, M.D., Sc.D., F.A.P.H.A.†

Third Vice-President, Metropolitan Life Insurance Company, New York, N. Y.

FOR the past two years, a study has been conducted in New York City schools, primarily for the purpose of finding out the reasons why extreme physical defects in school children remain uncorrected. The study has been directed by the Research Division of the American Child Health Association, in coöperation with the City Department of Health and the Department of Education, and with the guidance of an Advisory Committee representing the active participating, and certain other agencies. The committee was under the chairmanship of Dr. Philip Van Ingen, and the plan and research direction of the study was the work of Dr. Raymond Franzen (see full report). The inquiry was made possible by the financial support of the Metropolitan Life Insurance Company, in accord with the company's long established interest in and efforts toward the improvement of school health programs.

From the study there have been presented in the final report just published not only recommendations for changes in the New York City School Health Program, but also generalized principles of procedure that are deemed applicable

to other cities throughout the country. This discussion will center on those principles, merely drawing on the results as illustrative material.

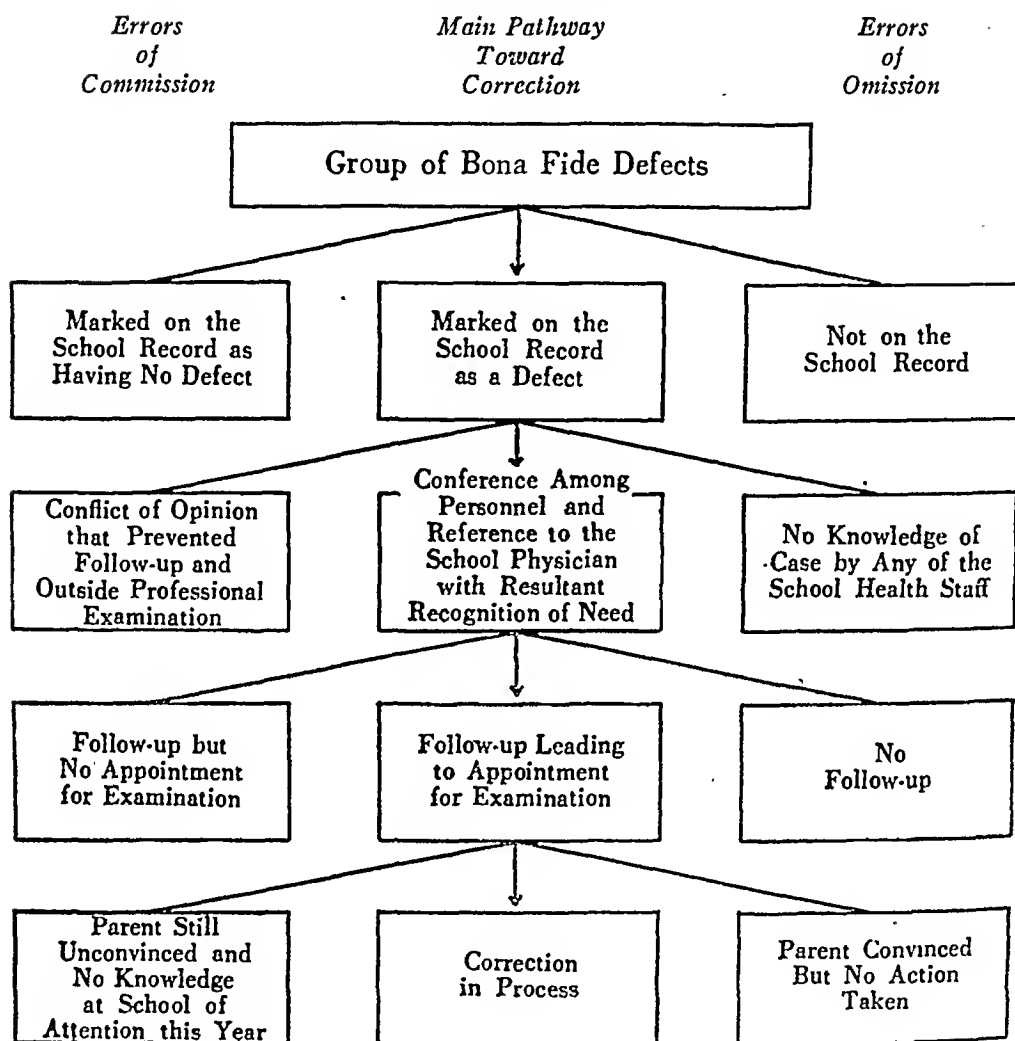
The plan of the study was somewhat unique. It concentrated on a limited phase of the school health program—the reasons for failure in securing corrections. This angle of the subject was emphasized in the belief that it would provide new points of view as to the effectiveness of the examination and follow-up efforts as a whole. The study first called for the independent and fresh identification of children with extremely severe physical defects which had not been corrected. This involved extensive preliminary work in the development of screening and verifying tests. The experience of the American Child Health Association in its School Health Study was drawn on heavily for this purpose. With the severe defect cases identified, the next step was an intensive investigation of these cases to determine the cause for the continued existence of the defect. The school records were inspected to see if the handicap had been routinely detected; the teacher was interviewed at length to ascertain what she had done to effect correction; the school nurse was questioned to find out what follow-up she had been carrying on; and, finally, a visit was made to the home in order to complete the information. Considerable preliminary experimental attention was expended in

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

† Prepared in collaboration with George T. Palmer, Dr.P.H., General Director of the Study for the American Child Health Association and now Secretary of the Department of Health of New York City; and Mayhew Derryberry, Ph.D., Associate Director of Research, American Child Health Association.

CHART I

METHOD OF CLASSIFICATION OF UNCORRECTED DEFECT CASES



developing the form of these inquiries. From an analysis of these exhaustive case histories, it was possible to determine what steps had been taken toward correcting the defect, if any, and wherein the failure had occurred.

As a means of summarizing the causes for failure, a schematic diagram was constructed (see Chart I), showing the usual steps that are taken in bringing about the correction of a defect. These steps, shown in the center of the chart, have been designated as the "Main Pathway Toward Correction." In addition, the chart shows the de-

viations or errors that may occur at each step in the procedure, thereby causing cases to be shunted out of the main pathway. The errors may be "Errors of Commission" (shown on the left), in that a wrong procedure has been followed, or they may be "Errors of Omission" (shown on the right), in that nothing has been done.

The first step on the pathway toward correction usually is an examination and the recording of the defect. The school may err in this step by failing to detect the severe condition, or it may fail to examine the child. Next, through a

pooling of information by the teacher, nurse, and physician, selected cases are placed on the nurse list for follow-up. In this step, there may be disagreement among the personnel concerning the need for follow-up or there may be a failure even to consider the case. Once the personnel are agreed on the need for follow-up, the remaining steps are usually follow-up, appointment for examination or treatment, and finally correction. The kinds of errors that occur at these stages are shown on the chart.

Four types of defects were studied in this manner: vision, teeth, nutritional status, and hearing. In addition, somewhat different types of investigation were made for tonsils, pediculosis, and awareness of health facts.

Perhaps the outstanding contribution of this study is the revelation of the major causes for lack of correction. These are not, as is so commonly believed, the lack of examinations or the failure of parents to respond. Primarily, they are the failure to identify the severe cases in the first place, and the failure to follow the cases through the successive steps to the desired outcome. Apparently, we have been too prone to blame parents for their indifference to information supplied to them. Actually, when the facts are closely examined, parents are less to blame than the school health program and the personnel involved in that program. In nearly nine-tenths of the cases with severe hearing defects, for instance, no notice had ever been transmitted to the parents. The same was true for two-thirds of the vision and nutrition cases, and for half of the severe dental cases.

The faults in the school health program may be traced to a number of causes, and these vary with the particular defect. In the case of hearing, the trouble lies almost wholly in the failure to detect the condition. It was either that no hearing test was ever made, or if made was never recorded, or

wrongly recorded as disclosing no handicap.

With dental defects, the situation is quite different. Children with bad teeth are usually known. They appear on the record. The loss comes in the second stage, in deciding which children to follow up. Here, great numbers with severe conditions are passed over with no further attention. The cause of this traces back to the method of marking defects in the first place. All the severe cases are noted, to be sure, but in addition to this, innumerable other cases of lesser severity are also noted on the records, and there is no distinction on the records as to the degree of severity. As a consequence, there is no basis for selection of the really severe cases, and children are chosen for follow-up on some other grounds than the severity of their dental defects. The number of children recorded with some dental defect is so great that the follow-up burden becomes overwhelming. The severe cases are lost in the very magnitude of the problem.

With vision and with nutrition, the losses are spread out over the different steps in the school health procedure. There is an appreciable loss at the outset in labelling cases normal when they actually have an extreme defect. Mistakes are made among the school health personnel in selecting cases for follow-up, and the follow-up itself is only too frequently superficial and ineffectual.

Lack of corrective facilities is a pronounced factor only in the case of teeth. But even here, only one-third of the parents are aware of the serious condition of their children's teeth. These parents have no excuse other than their inability or unwillingness to seek or find professional attention. The other two-thirds, as well as the parents of the children with vision, hearing, and nutrition defects, may properly plead ignorance. Little or no information has

been conveyed to them by school or health authorities concerning the cases under review in this inquiry. But let us not be misunderstood in these remarks. This study relates to severe uncorrected defects. When we say that the school health service has not conveyed information to parents in so many of these cases, there is no intent to imply that contact with the home has not been made for a great many other cases. Much successful corrective work has been instigated by the school health personnel. The study of these four conditions, it must be remembered, was focused on the severe cases that still remain uncorrected. It was limited to these cases and to an investigation of the failures in the attempt to identify the causes of the failure.

In the case of pediculosis, it was found, through a study of the activities of the personnel in a number of schools, that the reason for the failure to correct the defect, *i.e.*, delouse infested children, was the lack of a definite policy concerning the responsibilities of the nurse and teacher. The nurse considered that the teacher should see that the condition was cleaned up, and the teacher maintained that the nurse should do the necessary follow-up.

The investigation of the reason for failure to correct serious tonsillar defects could not be carried out in the same manner as the study of vision, dental, and nutrition defects. In the first place, there were no definite objective criteria of what constituted a serious tonsil defect. In the second place, a preliminary examination of 1,000 11-year-olds showed the rather astonishing fact that 61 per cent of the cases had already had a tonsillectomy. The study was then changed to focus on the methods of examination, recording, and follow-up that resulted in so many tonsillectomies.

Accordingly, the 389 children out of the original 1,000 who still retained

their tonsils were examined by a group of school examiners, and 45 per cent of them were recommended for tonsillectomy. The 215 cases not recommended by this first group of physicians were seen by another group of school examiners, and 46 per cent of these were recommended for tonsillectomy. The remaining 116 who had been marked as not needing attention by these two groups were seen by still a third group of school examiners, and 44 per cent of these were recommended for tonsillectomy. At the end of this experiment, there was left a residue of only 65 out of 1,000 who would not have had a tonsillectomy if all the recommendations of the physicians had been carried out. Furthermore, when a history was taken of the cases, practically no relation was found between the recommendations and a history of sore throats and colds.

The study of the follow-up revealed that nurses often followed up tonsil defects and neglected other serious conditions. In summary, the need in New York City with reference to tonsils is not more corrective work, as it was in the case of the other conditions, but rather more standardization and discrimination in the selection and follow-up that is carried on.

The experience in the study of these several defects gives rise to several recommendations for overcoming the difficulties that are revealed. The first is a proposal that the volume of the preliminary service—that is, the examination and the selection of defects—should be guided, if not determined, by the corrective services available. If the preliminary work is started wholly without regard to the corrective outlet, and the number of children started on the pathway to correction is so great as completely to overtax the outlet, then much of the preliminary effort is wasted. We say this advisedly. If there is no possibility of securing corrective service,

then there is no point in continuing to swell the number who need such service. We can either examine less or follow up only the really severe cases. In either case, it would seem to be far more sensible to save on the preliminary steps and devote effort and funds toward increasing the corrective service. As these services expand, then the preliminary examinations can be extended.

If we look at the matter frankly, I think we will agree that we have been too much concerned in getting children examined—examined quickly and frequently. We have been too little concerned with the character of the examination and with just how we were to make use of the facts gained from the examination.

The second proposal is that we should be more accurate, and, at the same time, more economical in identifying defects. Grave errors are now being made in picking out the cases most urgently in need of attention. Tonsils and nutrition as reported in this study are striking examples. There is no excuse for ignoring these facts. But improvement in accuracy does not necessarily mean increased expense. There are screening procedures that can be used first—simple tests in the hands of non-medical technicians, and histories as gathered from the daily observation of teachers. The time of the physician should not be used where others with less training can serve the purpose equally well. The physician—both the school doctor and the private family medical adviser, who can and should be utilized to a greater extent than at present—should be largely reserved for their professional, diagnostic, and therapeutic judgment, an attribute that others are unequipped to supply. Examples of these screening methods are discussed in the report.

Success in the correction of defects does not depend upon the doctor, the nurse, or the teacher alone. It is dis-

tinctly a coöperative job. There must be rapport between the different people concerned. This may sound trite. It is the old familiar coöperation which has been preached and preached and preached again. And yet, in spite of the best of intention and good will on the part of department heads, coöperation is often ignored in practice. There are glaring examples. There are doctors who spurn suggestions from a teacher. There are teachers who do not want to be bothered with any health matters. If families are going to be induced to do something about the facts disclosed in the school, then doctor, nurse, and teacher must work as a team. It is grossly ineffective to do otherwise.

This leads directly to another recommendation. The nurse must have information intelligible to the parent, backed by professional authority when she visits a home. It is not enough to tell parents about 2X tonsils or Number 4 Nutrition. She must equip herself with clinical facts, and the unfavorable history derived from school experience. Her source is the doctor and the teacher. There must be personal discussions. Records may be fewer, but fuller. If all the effort at follow-up is to mean something, then parents must be given substantial and convincing evidence. This is much more effective than the mysterious symbols used on the child's record card.

Further than this, there is the old question of records. Records must be alive. Cases should not be lost from official sight. Records should show the progress of any child on the pathway to correction. It should be possible to tell at a glance how many children and which children have reached each step along the pathway. This is a plea not for more records, but for records and filing methods better adapted to the needs.

The school medical program as now conducted is, in general, one of the least

efficient of our public health procedures. It has developed in a diversity of patterns, practically all of which represent different adaptations of the clinical or individual method to large school groups. These adaptations have usually resulted in just such inefficiencies as have been revealed in this study. Consequently, during the depression, this inefficient field of service has been the one that was most readily cut.

This study has not only pointed out the inefficiencies, but it has also sug-

gested new points of view applicable to large groups, and has indicated new lines of approach which should prove useful in the reconstruction of effective school medical programs. The committee that advised in connection with the work is unanimously convinced that those directly responsible for the inquiry have made a contribution of very great and far-reaching importance to the health and school organizations, and to the well-being of our urban school population generally.

Unemployment and the Physical Condition of Children in Germany

FOR the purpose of determining the effect of unemployment on the physical condition of children, studies have been made in several cities of Germany. In Kiel a study was made in 1933 of the records of physical examinations of 2,350 school entrants. The children were all 6 years old and were divided into 5 nearly equal groups, according to the family's economic condition. It was found that the average height and weight of children of unemployed persons on relief rolls and of partly employed persons were lower than those of children from better situated families and that the difference increased with the improvement in the economic situation.

A study made in Berlin in 1931 of 1,100 working class children varying in ages from 6 to 14, one-third of whom

were from unemployed families, showed that the average weight of the children of unemployed parents was $2\frac{2}{3}$ pounds less than that of children of employed parents, and the average height $\frac{3}{4}$ inch less. The study also revealed an inferiority in the general condition of the children of the unemployed, manifested by greater frequency of tuberculosis, nervous disorders, and difficulties of behavior.

In a study made in Vienna in 1932 of 800 children between 1 and 6 years old, half of whom came from unemployed families, it was found that 57.5 per cent of the children of the unemployed were below normal in weight, but only 34 per cent of the children of the employed.—*Archiv für soziale Hygiene und Demographie*, Berlin, vol. 8, No. 6, 1934.

Housing Problem in a Southern City*

With Special Reference to Its Influence on Residual Typhoid Fever and on Infant Mortality

L. M. GRAVES, M.D., AND ALFRED H. FLETCHER, F.A.P.H.A.

*Superintendent, City Health Department, and Sanitary Engineer,
City Health Department, Memphis, Tenn.*

ALL students of public health appreciate the fact that environmental hygiene plays an important part in the control of certain diseases. The term housing used in its broadest sense includes not only the house itself but the immediate surroundings, such as drainage, water supply, sewage disposal, the air breathed by the occupants, the presence or absence of sunlight, etc.

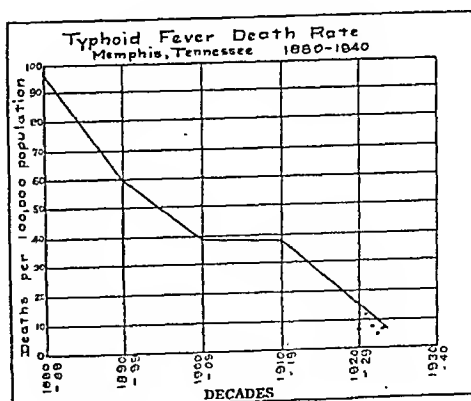
The relationship of housing to health has defied direct quantitative expression because of the many other factors indissolubly linked with the slums, such as poverty, ignorance, long and fatiguing hours of work, exposures to extreme weather conditions, malnutrition, inadequate medical and nursing care, etc.

It has long been recognized that the substitution of a safe for an unsafe water supply in a city is followed by a sharp drop in the typhoid case and death rates. It has also been observed, however, that the reduction is less marked in some cities than in others. This seems particularly true of southern cities as contrasted with those in other sections of the United States. Reasons for these higher residuals in southern cities seems

never to have been satisfactorily explained. Memphis in its early history obtained its water from Wolf River, a small stream which flows into the Mississippi at the site of the city. Later (1890) this source was supplemented by wells, but the system was still subject to contamination especially in flood season. In 1925 the use of river water was completely discontinued and a new system installed, using water from a series of deep wells. This last system has been recognized as a safe and satisfactory supply in every way. The typhoid death rate came down rapidly following these improvements in the water supply, as will be seen from the accompanying Figure I.

It will also be observed, however, that there remains a rather high residual.

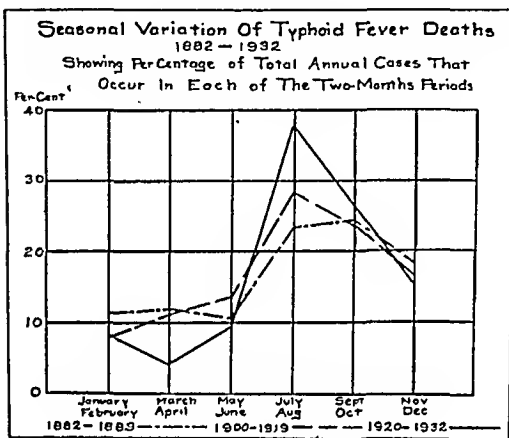
FIGURE I



* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

An interesting point in this connection is the change in seasonal prevalence. A higher percentage of deaths occurred in the winter and spring in the periods from 1882 to 1899, and 1900 to 1919, before the installation of the present safe water supply than during the last period 1920-1932, but a higher percentage of deaths has shifted to the summer and fall months for the period 1920 to 1932 than during the early years (see Figure II).

FIGURE II



The relatively high typhoid rate in Memphis may be partially explained by the fact that the city is the only hospital center for an unusually large poorly sanitized rural area which contributes a large number of nonresident deaths; but the fact remains that the rate is still higher than would be expected when the nonresident element is excluded.

In an effort to explain this high residual, it was decided that a study of the possible relationship between the typhoid death rate and housing conditions in the city would be desirable. As it was felt that some of the same factors influencing the typhoid rate might also affect the infant mortality rate, which is also high for the city, it was decided to include infant mortality in the study. The opportunity to make such a study was offered by the Civil Works Administration Program. With the assistance of Rollo H. Britten, Chief Statistician

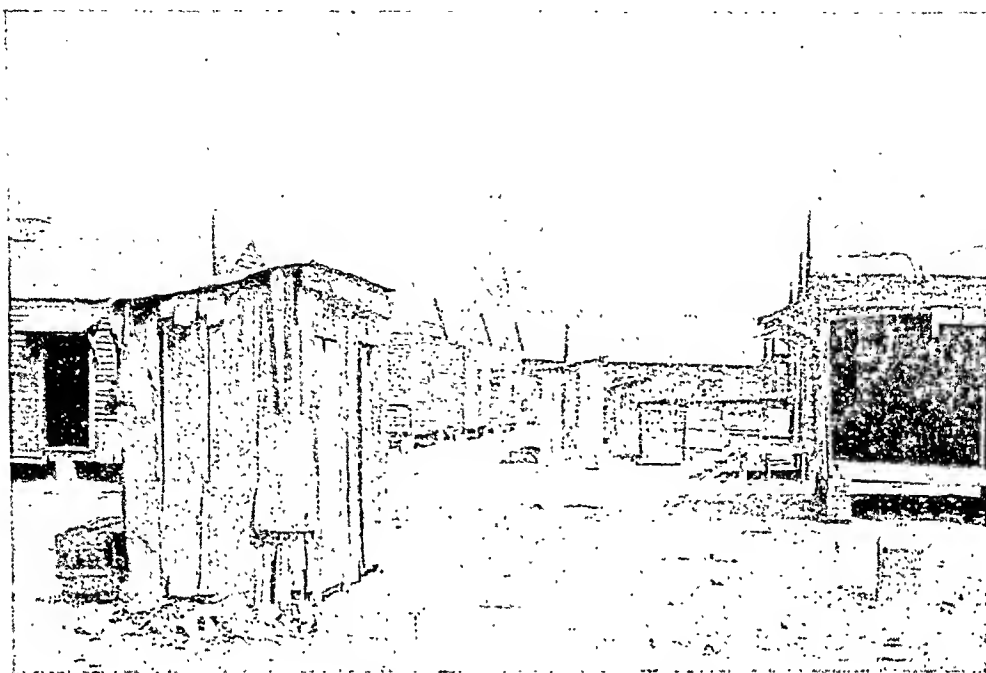
of the U. S. Public Health Service, a housing survey was carefully planned which was designed to yield information which it was hoped would shed light on the high typhoid residual and the high infant mortality rate, and could be used in other studies and in preparing an effective housing code for the city.

Thirty-five workers were employed for about 6 weeks. One block out of every 4 blocks in each ward was drawn by an architect or engineer, showing on a card the size, spacing, shape, and height of all buildings, and checked against the information on the survey cards which was secured on every living unit within these blocks.

Briefly the tabulated data will show:

1. The vacancy-occupancy conditions either by wards, by race, by condition of the house itself, and by state of sanitation and surroundings.
2. The physical condition of dwellings, by wards, or race and in other groupings, and including state of repair, construction of wood or other material, the roofing material, number of rooms, number without sunlight, number without windows and size of largest room.
3. The sanitation provided at each dwelling, grouped by wards or color. This included data on the source of water and how furnished to tenants. Whether have a bathtub and location of. How sewage disposed of, location of toilets, and safety of disposal method.
4. Pertinent facts concerning the tenants such as, persons per room in each living unit, the age grouping, number of pay boarders, families living in cellars, whether tenant owns or rents, weekly rental, and how long lived there.

A ward map of the city was prepared spotting those sections generally recognized by members of the Health Department as slum areas. They contain such conditions as those shown in the accompanying photographs, and were selected because of the obviously poor housing conditions. These pictures are inserted to enable students in other sections of the country to visualize the southern housing problem. The problem is not so much the lack of fresh air and sunlight, land or room overcrowd-



Poor Housing Conditions in Southern Slums

ing, as that until recent years houses have been built in the rear of lots and on alleys with outside communal toilets.*

Typhoid fever case rates, infant mortality rates, percentage without private toilets, persons per room, percentage of houses needing repair, and other factors, were computed for 9 population groupings:

- (A) and (B) Negroes in 2 groups of slum wards
- (C) For negroes in the suburban area or belt on the outskirts which has been recently annexed to the city.
- (D) For negroes in the remaining wards of the city.
- (A) to (D) inclusive. For negroes in the entire area studied.
- (A) and (B) For the white population for the 2 slum areas combined.
- (D) For the white population for the rest of the city exclusive of the recently annexed territory.
- (A) to (D) inclusive. For the white population for the city as a whole.
- (A) to (D) inclusive. For the combined white and colored rate for the city as a whole.

Table I shows these rates.

The typhoid fever case rates used in this paper are for the years 1929 to 1933 inclusive, which are the average number of resident cases per 100,000 population. The infant mortality rates are the average number of infant deaths per 1,000 live births for the years 1930 to 1932 inclusive.

It will be noted from this table that the highest typhoid case rates and the highest infant mortality rates are among negroes, and that the negro rates are highest in the slum areas. The highest rates for whites are also in the slum areas. A detailed study of the rates and factors involved in the suburban belt indicated that the rapidly changing conditions due to extensions of water and sewer mains and connections, together with nursing and sanitation service, make it necessary to exclude this area from our study.

Typhoid case rates for negroes in groups of wards within the slum area were studied in relation to the per-

* The word toilet as used throughout this paper does not refer to the privy but to toilets connected to the city sewer.

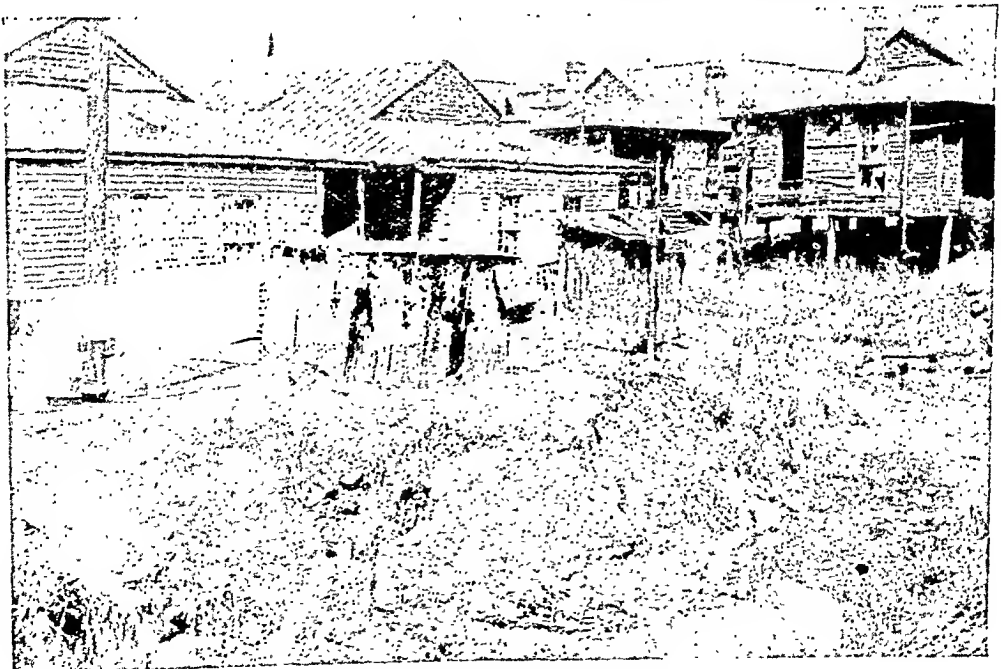
TABLE I

INCIDENCE OF TYPHOID FEVER CASES AND INFANT MORTALITY
IN 9 GROUPINGS OF THE POPULATION
COMPARED ACCORDING TO PER CENT WITHOUT PRIVATE TOILETS

Groups	Number of Wards	Area in Acres	Percentage Without Private Toilets	Population	Typhoid Fever Case Rate 1929-33	Infant Mortality 1930-32
"A" Colored	8	2,827	55.8	28,188	51.7	128
"B" Colored	6	1,554	92.2	13,446	38.7	118
"C" Colored	12	11,976	94.2	16,117	50.7	166
"D" Colored	24	12,822	60.0	38,799	35.0	111
"A + B" White	14	4,381	12.9	33,652	36.4	84
"D" White	24	12,822	2.1	102,766	22.8	53
Total Colored	50	29,179	69.2	96,550	41.0	128
Total White	50	29,179	8.5	156,528	27.0	64
Total	50	29,179	37.3	253,143	32.3	90.2

centage of families without private toilets which in Memphis means those families who use outdoor communal toilets. In a group of wards in which the percentage of families without

private toilets was 80 or above, the case rate was 64.2. In a group of wards where the percentage of families without private toilets was 60-79, the rate was 43.1. In a group of wards in which



Outdoor Communal Toilets

TABLE II
INCIDENCE OF TYPHOID FEVER CASES
AMONG COLORED IN SLUM AREAS
1929-33 INCLUSIVE
COMPARED IN THREE GROUPS ACCORDING
TO PER CENT
WITHOUT PRIVATE TOILETS

Group	No. Wards Falling in Group	Per-centage Without Private Toilets	Popu-lation	Ty-phoid Cases	Aver-age Annual Case Rate
A	4	80 & over	7,793	25	64.2
B	6	60-79	20,786	45	43.1
C	4	60 & less	13,055	19	29.1

the percentage of families without private toilets was below 60, the rate was 29.1 (see Table II).

A study of the negro infant mortality rates, however, did not seem to show a relation to the percentage of families living without private toilets as in the case of typhoid fever.

In order to make further comparisons of housing conditions to typhoid fever and infant mortality, a housing index was calculated for each ward by using the following three factors:

1. Persons per room
2. Percentage of dwellings not in good repair
3. Percentage of living units with outdoor toilets

The rank for each ward for each of these factors was obtained, placing them in order with the poorest ward at the top as No. 1, the second poorest ward as No. 2, etc. The average of the numbers representing the numerical rank of the ward for the 3 factors was taken as the housing index for that ward. This index was calculated for colored and white races, and in each case those

TABLE III
COLORED INFANT MORTALITY AND
TYPHOID FEVER CASE RATES
GROUPED BY WARDS
ACCORDING TO VARYING HOUSING INDICES

Group Index	Number of Wards	Typhoid Case Rate	Infant Mortality
0-4	4	59.4	177
5-9	4	39.4	118
10-14	8	36.7	117
15-19	6	38.3	113
20+	6	39.5	91

wards having the lowest housing index as a group, had the highest typhoid rate and also the highest infant mortality rate. The next high group had a lower rate and the highest group had the lowest rates. Although in the previous table the infant mortality rates did not show a relation to outdoor toilets, it did to groups of wards having varying housing indices as shown in Table III.

TABLE IV
WHITE TYPHOID FEVER AND INFANT
MORTALITY RATES
GROUPED BY WARDS
ACCORDING TO VARYING HOUSING INDICES

Group Index	Number of Wards	Typhoid Fever	Infant Mortality
0-12	12	47.8	78.8
13-24	12	17.3	69.2
25-37	13	22.7	48.6

TABLE V
CORRELATION OF WHITE TYPHOID RATES
ACCORDING TO PER CENT COLORED
WITHOUT PRIVATE TOILET

No. of Wards	Colored Rates	White Rates
9	50 or more	40.9
10	less than 50	20.0

In the case of whites a relation was also indicated between wards with low housing indices and high typhoid fever and infant mortality rates as shown by Table IV.

It is interesting to note that in the group of wards where the colored typhoid fever rate was 50 or more per 100,000 population, the white rate for these same wards was 40.9. In the remaining wards with rates of less than 50 per 100,000 population for the colored, the white rate was 20.0. This

correlation exists even though the percentage of outdoor toilets among the whites is negligible in all wards (see Table V).

OBSERVATIONS AND CONCLUSIONS

1. In this study both typhoid case rates and infant mortality rates were found to be highest in those wards which are obviously slum areas.

2. Typhoid fever rates for the colored in slum areas showed a relation to wards grouped according to percentage of living units without private toilets.

3. Infant mortality rates for the colored in slum areas did not show a relation to wards grouped according to percentage of living units without private toilets.

4. Wards were grouped for purposes of comparison according to a slum index.

5. Typhoid fever case rates and infant mortality for both the white and colored races showed a relation to wards when grouped according to their slum index.

6. Typhoid fever rates for the whites showed a relation to wards when grouped according to typhoid fever rates for the colored race or when grouped according to percentage of colored living units without private toilets.

DISCUSSION

CHARLES GILMAN HYDE, F.A.P.H.A.

Professor of Sanitary Engineering, University of California, Berkeley, Calif.

THE authors have presented a paper of great value and interest and are deserving of the highest commendation. A vast amount of statistical work has been involved in its preparation. The information contained therein is of the sort which is fundamental to a better understanding of the complex and interwoven factors concerned with the matter of housing as related to health in general and, more specifically in this case, with respect to residual typhoid fever and infant mortality.

When once the water and milk supplies have been removed as sources of infection, the problem of typhoid fever incidence becomes one of the restricted local environment. The main factors

are contact and flies, and possibly certain contaminated foods. To the extent that housing reflects these factors or conditions, to that degree residual typhoid fever may be related thereto.

The relationship between the public water supply and the typhoid fever death rate through a considerable period of years has been well and explicitly shown by the authors. With the decreasing use of Wolf River water, a polluted source of supply, and with improved sanitation in other respects, the typhoid fever death rate was notably reduced until at length, in 1925, the public water supply was no longer involved. The death rate has been reduced from about 95 in the 10 year

period from 1880 to 1889, as shown by the authors, to about 23.5*¹ in the years 1924-1926 inclusive; and to a residual in 1929 of only 5.3.¹ It is safe to say that it is only a matter of time, and perhaps a relatively short period, when the typhoid fever death rate in Memphis will have reached a very low and, in a practical sense, an almost insignificant value.

The City of Memphis is fortunate in having an abundant supply of ground water (well water) of highest quality in every respect. There are only 3 other cities in the United States at the present time, having populations in excess of 100,000 which derive their entire supply of water from the ground: Dayton, Ohio (population 200,000), Lowell, Mass. (population 100,000), and Spokane, Wash. (population 116,000).

It is to be expected that, under the existing circumstances, the elimination of the public water supply as a factor in the typhoid death rate would de-

crease the percentage of cases occurring in summer and fall. With the lowered incidence of typhoid, in general, the number of carriers is proportionately reduced, presumably, and the volume of infectious material likewise reduced. Thus the fly infection danger, although always significant so long as there are exposed typhoid dejecta, becomes less menacing and important. The saying that "Nothing succeeds like success" applies well to the warfare against infectious diseases such as typhoid. Once the absolute incidence is lowered, all possible sources of local environmental infections are also reduced.

In the time available to the speaker since the receipt of this paper it has been impossible to review in detail the climatic conditions of temperature, rainfall, and humidity which might have a more or less controlling effect upon fly breeding. However, the monthly rainfall, temperature, and humidity statistics for Memphis for the year 1930 were compiled.² These are presented in Table I. It is hoped that the conditions for 1930 were sufficiently typical

* Actually typhoid and paratyphoid, with rates approximately as follows: 1924, 31.1; 1925, 24.5; 1926, 15.6.

TABLE I
RAINFALL, TEMPERATURE, AND HUMIDITY AT MEMPHIS
BY MONTHS, YEAR 1930²

Months	Rainfall Inches	Relative Humidity			Temperature—Deg. F.		
		8 A.M.	12 M.	8 P.M.	Mean	Max.	Min.
January	12.12	80	71	76	36.2	43.2	29.2
February	4.78	74	64	66	52.7	60.4	45.0
March	3.12	68	55	58	51.2	59.4	43.0
April	1.45	63	45	44	65.8	74.5	57.1
May	5.86	77	57	64	70.6	78.5	62.8
June	0.19	63	40	40	78.9	88.5	69.3
July	0.14	64	41	40	85.4	95.3	75.6
August	0.49	67	44	44	81.4	91.3	71.4
September	2.12	80	58	59	76.8	85.7	67.9
October	1.96	75	51	56	61.5	69.9	53.1
November	2.42	78	65	64	52.0	59.3	44.3
December	2.81	80	66	65	41.0	47.3	34.8
Totals	37.46	..	..	..	....	....	....
Averages	3.12	72	55	56	62.8	71.1	54.5
Maximum	12.12	80	71	76	85.4	95.3	75.6
Minimum	0.14	63	40	40	36.2	43.2	29.2

to warrant the making of certain deductions therefrom.

Hutchinson³ has shown that flies are fairly active at 55° F. and very active at 65°. A mean daily temperature in the vicinity of 60° may perhaps be assumed to represent the critical temperature below which fly breeding will not be very important and above which it may become serious. If this is true the fly breeding season in Memphis would perhaps begin in April and continue to or through October. Typhoid due to fly infection might therefore be expected to occur from May to November, reaching a peak in July and August. In 1930 the months of June, July, and August were relatively dry, both in terms of rainfall and humidity. This condition would not perhaps greatly affect fly breeding in covered spaces, but it would reduce that which might otherwise occur in scattered manure and feces out of doors.

The unscreened houses and communal toilets shown in the photographs suggest that aggravated conditions of fly

infestation and infection may obtain. Such infections would, of course, normally be reflected in the typhoid incidence and in infant mortality as well, especially in that portion due to diarrhea and enteritis. The communal toilet is almost bound to be unspeakably filthy, occasionally if not continuously. It may cause the use of the ground and of all sorts of protected spots for both urinal and fecal discharges. To what extent this practice prevails is not revealed by the authors.

The authors' findings indicate that the typhoid incidence is closely related to the extent of use of the outdoor communal toilets. The travel habits of the fly are such that it may be expected that typhoid would occur among populations provided with private toilets if their abodes are in the general vicinity of filthy outdoor toilets.

With reference to infant mortality Whipple⁴ has stated:

No part of vital statistics is attracting more attention nowadays than the subject of infant mortality. It is, indeed, a serious problem

TABLE II
STUDY OF CONDITIONS IN JOHNSTOWN, PA.
1915

Dirty dry homes versus clean dry homes	162/105	154%	Midwife's attendance at birth versus physician's attendance at birth	180/100	180%
Dirty damp homes versus clean damp homes	204/127	161%	Foreign illiterate mother versus foreign literate mother	214/148	145%
Dirty damp homes versus clean dry homes	204/105	194%	Artificial feeding only, average of 2nd and 3rd months of life, versus breast feeding only during that period	227/63	360%
Yard privies versus water closets	159/108	147%	Very inadequate income, foreign parents, versus adequate income, foreign parents	251/108	232%
Outside, only, versus inside water supply	198/118	168%	Very inadequate income, native parents, versus ample income, native parents	146/78	187%
Baby sleeping with others versus baby sleeping in separate bed	109/56	195%	Very inadequate income, foreign parents, versus ample income, native parents	251/78	322%
Baby sleeping in room with more than 5 others versus baby sleeping in room alone or with 1 other only	123/67	184%			
Baby's room poorly ventilated versus baby's room well ventilated	169/28	604%			

and worthy of most careful study. It is a complex problem and one difficult to understand. It is a problem which goes beyond itself. Newsholme says that "infant mortality is the most sensitive index of social welfare and of sanitary improvements which we possess." Another says that "infant mortality is to the health officer what the clinical thermometer is to the physician." People who will not take care of their offspring will not take care of themselves.

The authors have very appropriately pointed out that infant mortality is inextricably associated with a great variety of social and economic factors as well as those represented by the physical environmental conditions. The relationship to a considerable number of such factors is shown in an illuminating fashion by an analysis of the results secured by an intensive study of infant mortality at Johnstown, Pa., in 1915, by the Childrens Bureau, U. S. Department of Labor.⁵ Some of these factors

and their effects, expressed in terms of the greater infant mortality under adverse conditions than under fair to excellent conditions, may be stated as shown in Table II.

Some of the conditions recited there undoubtedly have a direct bearing upon infant health. It is obvious, however, that others are in themselves not directly involved but they do reflect generally low or adverse conditions which are immediately associated with a high infant mortality rate.

Effective health control in cities with large percentages of colored population unquestionably represents a very much more difficult problem than that encountered elsewhere. In spite of this handicap many such cities have made remarkable progress. This is the case with Memphis. The writer inclines to the belief that the conditions of health today in southern cities with well or-

TABLE III

ESTIMATED TOTAL POPULATIONS AND DEATH RATES TOTAL (ALL CAUSES), INFANT AND TYPHOID FEVER, FOR CERTAIN NORTHERN AND SOUTHERN CITIES IN THE UNITED STATES, YEAR 1929¹

Place	Estimated Population	All Causes		Infants		Typhoid Fever	
		Deaths	Rate *	Deaths	Rate †	Deaths	Rate †
Northern Cities							
Columbus, O.	285,000	4,170	14.6	379	133	7	2.5
Denver, Col.	285,000	4,170	14.6	401	141	7	2.5
Oakland, Calif.	277,000	3,160	11.4	196	71	3	1.1
Providence, R. I.	252,000	3,630	14.4	371	147	5	2.0
Rochester, N. Y.	325,000	3,960	12.2	370	114	2	0.6
St. Paul, Minn.	268,000	2,940	11.0	238	89	3	1.1
Toledo, O.	286,000	3,940	13.8	395	138	1	0.3
Averages	283,000	3,710	13.1	336	119	4.0	1.4
Southern Cities							
Atlanta, Ga.	263,000	4,190	15.9	477	181	16	6.1
Birmingham, Ala.	252,000	3,940	15.6	479	190	15	6.0
Memphis, Tenn.	244,000	3,880	15.9	423	173	13	5.3
Nashville, Tenn.	150,000	2,720	18.1	326	217	20	13.3
New Orleans, La.	452,000	8,030	17.8	748	165	44	9.7
Richmond, Va.	182,000	2,940	16.2	291	160	3	1.6
Washington, D. C.	482,000	7,430	15.4	629	130	15	3.1
Averages	289,000	4,730	16.4	482	167	18.0	6.2

* per 1,000

† per 100,000

ganized health departments are simply those of a comparatively few years ago in northern cities which had no such handicap. This lag will assuredly be gradually overcome except in so far as basic inherited and inherent population tendencies and traits control ultimate progress. As a matter of interest in this connection the speaker has selected, somewhat at random, 7 northern cities with no very considerable colored populations, and 7 typically southern cities, including Memphis, all places in both groups having as nearly as possible the same population as Memphis. For these 14 places for the year 1929 the crude total death rates (all causes), typhoid fever death rates, and the infant death rates have been computed. The figures are presented in Table III. It will be observed that the estimated average population of the 7 northern cities is

283,000 and that of the 7 southern cities is 289,000.

While the average typhoid fever death rates in the selected southern cities is several times those in the northern group of cities, the former is not high, in absolute terms, and is so small in comparison with those of many other diseases as to constitute an almost negligible proportion of the total death rate. It should be noted that in all of the cities included in the table the public water supply is of excellent quality and is not a factor in the typhoid fever death rates.

REFERENCES

1. *Mortality Statistics*, U. S. Bur. of the Census.
2. *Annual Report*, Chief of U. S. Weather Bur.
3. Hutchinson, R. H. Overwintering of the House Fly. *J. Agri. Res.*, 13, 3, 1918.
4. Whipple, G. C. *Vital Statistics*, 2nd ed. Wiley, 1923.
5. *Infant Mortality of Johnstown, Pennsylvania, 1915*. Children's Bur., U. S. Dept. of Labor. Cited by Whipple.⁴

Imagination in Public Health

" . . . We have always been impressed from our earliest student days with the presence of the great killing diseases. Much greater is the conception that these diseases are primarily the disabling diseases of succeeding generations. Whatever we die of in a way matters less than how we live, and we should in our visualisation of preventive medicine be far more deeply concerned with the causes that underlie the disabilities of the active periods of life than with the specific and direct agencies of death. If we so concern ourselves in our considered thoughts we shall, in fact, eventually attain a much higher level of accomplishment than is otherwise possible to us. What is the vision that we therefore have? Briefly, it is that the minor disablements, the

chronic incapacitation of life—such as susceptibility to respiratory catarrhs, chronic dyspepsia, hepatic inefficiencies, disorganisation of the functions of endocrine glands, practically all of the ailments which make for so much of life's discomforts and restraints from full activity—are the manifestations in succeeding generations of injured germ plasm.

Expressed in another way, I would put it to you that the great mass of minor human ailments is the result in succeeding generations of the damage that has been done to parents or grandparents by the presence of one or more of the great disabling diseases. . . ."
—Dr. R. Veitch Clark, *Imagination in Public Health*, *Public Health*, Nov., 1934, p. 61.

The Public Health Officer and the Control of Syphilis*

JOSEPH EARLE MOORE, M.D.

Baltimore, Md.

I HAVE never accepted an offer to speak before a gathering of physicians with more diffidence than on this occasion. For me, a clinician, to address an audience of public health officials on the subject of the public health aspects of syphilis control is indeed like carrying coals to Newcastle; and this is especially true since your own Commissioner of Health, Dr. Parran, is without question the foremost authority in the country on this topic. To cover the whole field adequately, it would only be necessary for me to repeat verbatim his De Lamar lecture¹ of 3 years ago.

Nevertheless, the clinician engaged in syphilology cannot fail to have rubbed elbows with the public health officer, to have formed some personal opinions as to the adequacy of our present mode of approach to the problem, and to have acquired ideas as to the best method of attack in the immediate future. This is my excuse for addressing you. I hope that you will regard my ignorance of matters administrative and political with leniency and make allowances for the fact that I am invading unfamiliar ground. I hope for pardon, too, if I utilize my own city, Baltimore, as a background for some of my statements and opinions. After all, what is applicable in a large city of one state is—

or should be—equally applicable to other large cities.

I have emerged from 15 years of experience in clinical syphilology with several firm convictions. These are: (1) that syphilis is easily the most prevalent of the major communicable diseases; (2) that, directly and indirectly, it costs the taxpayer more than any other infectious disease; (3) that there are already available the weapons with which it might be, if not entirely stamped out, at least reduced from a major to a minor problem within a generation; (4) that though these weapons have been available for a decade or more, we are progressing not forward, but backward—syphilis in this country is actually increasing, not decreasing; (5) that the blame for this paradoxical situation may be placed, at least in part, on the shoulders of the public health officer. This last is, I realize, a bold statement, and may, indeed, like many of the arguments of my fellow townsman, H. L. Mencken, be an over-statement, purposely made to startle an audience. I think, however, that it can be justified. Let me amplify my several points.

In Baltimore, during the 5 year period, 1929–1933, there were more cases of syphilis *reported* to the City Health Department than of any other communicable disease.² Its only close contenders are chicken pox, measles, and influenza.² More than 18,000 cases of

* Address before the annual convention of Health Officers and Public Health Nurses, Saratoga Springs, N. Y., June 26, 1934.

syphilis have been reported during these 5 years. Startling as these figures are, it is estimated that they represent less than half of the new cases discovered. Three reasons lead to the certain knowledge that the actual number is far larger than the reported number: (1) that reporting is required by name and address, and the regulation is thus obeyed only by hospitals and clinics, but by few or no private practitioners; (2) that the Health Department has heretofore required only the reporting of fresh infections, not of patients with late syphilis, even if diagnosed for the first time; (3) the study of venereal disease prevalence in Baltimore carried out by the U. S. Public Health Service and the American Social Hygiene Society,³ which estimates (1930) that the annual incidence rate of early and late syphilis is 8,460 cases, more than double the 3,276 actually reported to the Health Department in that year. Were all freshly diagnosed cases reported, whether early or late, I am convinced that the number of cases in Baltimore during this 5 year period would nearly treble that of its nearest competitor, varicella. More than that, each of the years, 1929-1933, has seen a progressive increase in the number of cases of syphilis reported: in 1933, 4,500 as compared with 3,100 in 1929. Worse still, the deaths from syphilis—counting only those reported to the Health Department as actually due to syphilis—exceed the deaths from any other communicable disease except the two leaders, pneumonia and tuberculosis. This statement does not include the deaths from syphilis masquerading under more polite but less definite names. Could these be identified, I believe that syphilis, instead of ranking third as a cause of death, would actually have topped all other communicable diseases. Considering the stress that is laid among public health officials themselves and in the lay press on the reduction of the

comparatively trivial mortality from, let us say, diphtheria, this is a sorry record indeed.

Now as to my second point, the costs of syphilis to the community. This is almost impossible to determine with accuracy, because the ramifications of the disease are so wide. It spreads from the free clinic to the hospital wards, from the private practitioner to the state insane asylum, from the obstetrical clinic to the deaf, dumb, and blind asylums. The nearest approach to accuracy has been provided by Loeffler,⁴ in his 1932 study of the costs of venereal disease to St. Louis. Here, gonorrhea and syphilis are not separated, though from his data it may be assumed, I think, that syphilis is responsible for the great majority of the financial burden. Nor does he attempt an estimate of the vast economic loss to industry and society through the incapacity and death of afflicted persons. The actual cost of venereal disease—largely syphilis—to the tax payers of St. Louis is estimated at \$600,000-\$1,000,000 annually; and in addition, another million and a half is spent by patients for physicians' fees and for private hospital care, or for patients by such welfare and charitable agencies as the private hospitals themselves, the Community Fund, etc. Of the million dollars expended by the tax payers, however, only a drop in the bucket—about \$60,000—is spent where it would do the most good, *i.e.*, in the treatment of early syphilis. The rest goes to the upkeep of broken-down cardiacs, the blind, the insane—in short, patients who not only are no longer a public menace, being no longer infectious, but who are also for the most part relatively hopeless therapeutic problems.

In Baltimore, a million dollars represents 10 cents in the tax rate—10 cents on each \$100 worth of taxable property. No estimates of the cost of syphilis in Baltimore are available, but

it is a city of almost exactly the same size as St. Louis, with a larger proportion of negroes—which in the depression is synonymous with a larger proportion both of indigents and of syphilitics—and hence with a bill of approximately the same or greater size. And in Baltimore, as in St. Louis, most of this money is spent, not where it might help to minimize the problem of syphilis, *i.e.*, on the adequate treatment of recent infections, or on the prevention of late progression or relapse by the treatment of latent syphilis, but on the patient whose late lesions, often crippling, have already developed.

My third and fourth points need little elaboration. Everyone knows that with the arsphenamines and the heavy metals, the infectiousness of syphilis may be controlled; better still, the disease may be "cured." Our difficulty in this respect has not been that the weapons were lacking. Rather, it lies in two other facts: (1) the widespread ignorance of physicians as to how to use the available methods of attack, an ignorance which extends, unfortunately, even among the medical personnel of some clinics run by Departments of Health; and (2) our inability to persuade patients to continue treatment to the necessary limits. I shall offer presently my own opinion as to practical methods by which public health officials may meet, at least in part, these two difficulties. As to the effects of our failure to utilize available methods, I need not weary you with detailed statistics. It is necessary only to point the contrast between the rising trend of syphilis in Baltimore and northern New York State, for example, with the equally rapidly falling trend in England and in Denmark.

As to my fifth belief, that some of the blame for this situation rests on the shoulders of the public health officials, I must attempt to justify myself. I cannot think that public health experts

fail to recognize the magnitude of the syphilis problem. The facts are everywhere protruding like a sore thumb. The simile is reasonably apt, since, like a sore thumb, syphilis is something to be hidden. With the average physician, practitioner or public health official, as with the average layman, syphilis is inextricably tied up with vice, prostitution, and penitentiaries. It is a disease which always attacks somebody else's family, never one's own. It is not to be mentioned in public; in fact, and except for a brief period of publicity during the war, it cannot be mentioned in the press of Baltimore, except by the nauseous euphemism of "social disease"; and Parran's achievement in having its name spread across the front pages of New York papers is almost unique as a public health and a journalistic achievement. There is a conspiracy of silence regarding the venereal diseases in which I believe that public health officials not only share, but for which in large part they are responsible. Their responsibility lies in the fact that, far more than other physicians, they are involved in intimate relationship with every other member of the medical profession and with the lay public. So far as communicable diseases are concerned, they are, or should be, the mouthpieces of medicine.

The conspiracy of silence involves their relationships with the medical profession itself as well as with the laity. It begins, unfortunately enough, in schools of hygiene and public health. The catalogue and announcements for 1933-1934 of the School of Hygiene and Public Health of the university with which I am connected lists, in the course of the 2 year program leading to the degree of Doctor of Public Health, only a small fraction of one short course on the subject of venereal disease control, in the midst of a welter of courses on parasitology, bacteriology, vital statistics, sanitation, etc., and no

hours at all are devoted to practical work in the venereal disease clinics, familiarity with which is essential if the Doctor of Public Health is to know one of the greatest of his future problems.

It extends to the relationships of the health department with practitioners of medicine. Many health officials feel that their duty as to syphilis is complete when they have provided a free Wassermann service and a free clinic for the treatment of the poorest class of infectious patients. Relatively much less stress is laid on syphilis than on the 10 times less prevalent diphtheria, or even on the nearly extinct dodo, typhoid fever. There is no organized effort to develop a sane method of reporting new cases, a method with which practitioners will cooperate because the secrecy which their patients demand is respected, not violated. Syphilis is not classified as a communicable disease, but as a problem apart. It is of interest that even in the weekly *Public Health Reports* of the U. S. Public Health Service, which provides the weekly incidence of a number of communicable diseases in the registration area, syphilis is not listed among them though it is the most important of them all.

Syphilis is at least mentionable between physicians. It is when the health official meets the layman that the conspiracy of silence is still more evident. I lay no particular stress on the fact that in contacts with the general lay public, syphilis is rarely if ever discussed. I am one of those who believe that so far as the medical profession's relationship to venereal disease control is concerned, it is hopeless to place much reliance on the sex education of children in schools, or of adults through pamphlets, radio talks, or magazine articles, or, for that matter, on any part of the complex program advocated by the social hygienists except that which deals with medical control. That part of the population which needs instruc-

tion most is the very part incapable of assimilating it. Those who can understand are, for the most part, already able to protect themselves, or through prudery refuse to read or listen. There is, however, a selected group of the laity with whom the public health officer must talk, namely the political officials in charge of government. It is necessary, of course, to sell one's budget to an audience of laymen—city councilmen, state legislators, congressmen. It is easier to lay stress on the dramatically swift consequences of the acute exanthemata than on the dreary chronicity of ultimate breakdown from syphilis. It is easier to arouse public interest and support for funds for free antitoxin for diphtheria control, for milk for malnourished babies, for wholesale tonsillectomies on inspected school children, even for the control of hog cholera, than it is for the victims of syphilis—a disease which is, to use the old Army phrase, the result of one's own misconduct. Unfortunately, this line of least resistance is usually adopted.

In one respect, of course, and whether or not his job is due to political favor, the public health officer often feels that his position is similar to that of other public servants—he cannot proceed faster than public opinion will permit. At present, he believes that public opinion is unwilling to face the facts about syphilis. Therefore, let us wait until it is better prepared. But the public health officer is dealing with a highly technical field in which he must lead, not follow, public opinion; and in no disease does that opinion require intelligent professional leadership so much as in syphilis. Again, one must admit the fact that in any public office, including that of public health, things are accomplished by a system of political give and take. Making all allowances for these two factors, however, it ought to be possible for the public health

officer to use three arguments in dealing with his political confrères: (1) that syphilis is the most prevalent and, therefore, the most deadly of the major communicable diseases; (2) that the disease is not always the result of one's own misconduct, indeed, that innocently acquired marital infections and congenital syphilis make up nearly half of the total, and that a baby dead of congenital syphilis is fully as pathetic as one dead from diphtheria; (3) that even if every infection with syphilis were acquired by means of commercialized vice, it would be an actual saving in money to the community to provide the means for all to receive early adequate treatment, with the aim of reducing not only infectiousness and the spread of the disease to others, but also the late sequelae, and hence the amount of money which must otherwise be spent on the treatment or charitable care of patients with aortic aneurysm, tabes dorsalis, or paresis. The politician is, I think, definitely interested in saving money; the depression has taught him that. Even if the politician is deaf to economic arguments, the tax payer is not. His interest is a keen and urgent one. It is probably true that the expenditure of \$10,000 yearly for the treatment of early and latent syphilis will save the community an ultimate \$100,000 per year. Even though this be a relative rather than an absolute saving, in the sense that hospital bed space and charitable care now expended on syphilis are freed for other purposes rather than completely eliminated, the community gain is worth while. Presented in this fashion, and backed by the easily obtainable opinion and support of medical and lay leaders, I believe that even the deafest politician may be persuaded to listen. He might even be brought to the point of transferring to syphilis control some of the money now spent on more purely political or less productive purposes.

If the health official's job depends on partisan politics, of course his situation is well nigh hopeless. If, however, his tenure of office depends on the efficient performance of his duty, he should certainly have courage enough to appraise the syphilis problem in his community, to determine how much money is necessary to deal with it properly, and to attempt to get the money. It is his job to point out that syphilis control promises more of immediate and ultimate community benefit than some other more purely cultural or mayhap political item.

I realize fully how presumptuous it may be for one who is neither public health officer nor political official in charge of government to attempt to appraise the relative value to the community of various items in the municipal, state, or national budget. In Baltimore, however, out of a total expenditure of 43 million dollars for 1934, the appropriation for the Health Department is only \$686,000 (1.6 per cent), and within that appropriation, the allocation of funds to venereal disease control is only \$39,000. This relatively insignificant sum is inadequate to permit the treatment of all applicants at the overcrowded city clinics, so that, in order to keep within its budget, the Health Department has been forced to accept only those cases which are actually or potentially infectious, and therefore a menace to the public health. Only the following categories of patients are now acceptable: those with primary or secondary syphilis, those with early latency (*i.e.*, infections of less than 3 years duration), or, if no history of infection is obtainable, women under the age of 40 (because still within the childbearing period), and men under the age of 25 (because presumably infection has been relatively recent).

The result of this policy (which, from the point of view of the Health Department and its budgetary restric-

tions, I must defend, since I assisted in framing it) is that the treatment of practically all patients in Baltimore with late—and especially latent—syphilis is thrust upon the shoulders of 6 clinics run by one state hospital and 5 privately endowed hospitals. Only 2 of these 6 clinics are large. Their facilities are utterly unequal to the burden; patient after patient with late or latent syphilis must be turned away with some such statement as: "You have syphilis and should be treated for it. We are unable to accommodate you here; the city makes no provision for your care; your only chance to be treated is either to pay a private practitioner or (since this is usually impossible) to tell the mayor or your city councilman of your difficulty and to request relief." It was estimated that this situation could be corrected, and treatment facilities provided which would ultimately have saved the city or state the cost of many hospital bed days through the prevention of progression or relapse in treated patients, by the additional expenditure through the Health Department of \$10,000 yearly; yet this sum of money could not be obtained!

Let us assume that the public health officer in drawing up his budget has assigned to syphilis the major importance it deserves, that he is willing to emphasize this item in his dealings with the budgetary authorities, and that he is successful in selling the idea of its essential nature—how can the funds thus secured be best employed to reduce the incidence of the disease? No amount of thought would enable me to put the remedy more succinctly than it has been put by Parran:¹

In principle, the whole problem of the control of the venereal diseases comprises just two elements; first, every infected person must take treatment promptly after infection, and second, facilities for diagnosis and treatment must be made available and must be utilized. These two administrative factors are self-explanatory.

The problem may be stated from a different viewpoint in terms of basic principles:

Legal aspects of the public health program should include: notification of cases, particularly lapsed cases; notification of sources of infection; authority to examine contacts; quarantine of irresponsible patients after other efforts have failed.

Medical services to insure early diagnosis and complete treatment should comprise laboratory diagnostic facilities, including dark-field examinations, adequate clinical services on a full payment, partial payment, and free basis; free distribution of drugs as necessary, to physicians as well as to clinics; payment of physicians in rural areas and small villages for treatment of those unable to pay; and early preventive treatment after exposure.

Epidemiologic measures should include intensive inquiry in every early case both in clinic and private patients, to determine the source of infection; examination of contacts in families and elsewhere; and concentration of effort where necessary on early infectious cases.

Medical social service and nursing assistance should be available to physicians as well as to clinics for the purpose of assisting family adjustments, of making visits to the home, of returning lapsed cases for treatment, and of persuading contacts in homes and elsewhere to be examined and if infected to seek treatment.

Education should include training of the necessary public health personnel; physicians, nurses and social workers; better training of private physicians by undergraduate and post-graduate education and part-time service in clinics; education of the public by every available method, including education of special groups in prophylaxis; and specific training of the patient.

On certain of these items, I as a clinician lay particular stress. As to notification of cases, it seems to me highly desirable that a uniform system of reporting the venereal diseases be adopted throughout the registration area of the United States; that the persuasive prestige of the U. S. Public Health Service be brought to bear upon state and municipal health departments in an effort to secure such uniformity; that this system safeguard the identity of the patient by avoidance of the use of name and address; and that its observance be repeatedly and constantly urged

upon practitioners through frequent bulletins issued by health departments. Could this be accomplished—and surely it would cost relatively little—we should at least have a clearer idea of what our problem is, and what impression we are making upon it.

Such legal measures as are involved in the prevention of delinquency and the suppression of commercialized vice are not properly part of the public health officer's duty nor chargeable against his budget. Nevertheless, his intelligent interest and coöperation with the proper agencies of law enforcement may be of far reaching influence, with no expenditure other than of his time.

The provision of adequate medical services is the crux of the situation. I have already said that although we have had available for a decade or more the means of dealing with the syphilis problem, they are not being applied, and that the fault lies squarely on the shoulders of the medical profession. There is, I think, no use in blinking the fact that, by and large, syphilis is badly managed by the average practitioner, and that, by and large, the service provided in the average venereal disease clinics, whether run under public health or private auspices, is not much better. In private practice, the faults are of both omission and commission. Even when outspoken lesions are present, syphilis is often erroneously diagnosed because of failure to do a Wassermann test. There is little or no concerted effort to detect the latent syphilitic (who is at least potentially a carrier) by means of routine Wassermans. Why this should be when free Wassermann service is so amply provided by health departments generally is a mystery. When syphilis is recognized, it is usually poorly treated; there is little or no effort to determine the source of infection or to examine contacts. Clinic service is better than this in some respects, but fully as poor in others.

As I have already said, the reasons seem to me to be two: actual lack of knowledge on the part of the medical profession on the one hand; and whether or not this is present, inability or lack of desire on the part of patients to carry through with the necessary examinations and treatment because of the vastly important economic factor.

How can we improve the standard of knowledge of the medical profession, and if it can be improved, in what way can public health officials be of aid in this connection? Education begins, of course, in medical schools. A recent survey by the American Social Hygiene Association of the facilities available for teaching syphilis to medical students in the seventy-some schools in the country⁵ disclosed that in many of them these facilities, or the amount of time devoted to them, are woefully inadequate. Perhaps it might not be amiss if the public health authorities, beginning with the U. S. Public Health Service and extending downward to state, county, and municipal public health services, were to outline to the deans of the several schools the magnitude of the problem in the country at large and in their several communities, and to urge that the facilities for teaching syphilis to students be expanded or more largely utilized. Assuming, however, that with public health and other pressure the instruction of students could be brought up to a uniform standard of excellence, it would require a generation for this improvement to make itself felt in practice. We want quicker action than this.

Quicker action may be obtained, of course, only if the standards of physicians actually in practice can be improved, and if patients with syphilis can be brought into the hands of the physicians. Let us consider these points. The overwhelming majority of practitioners are beyond the reach of formal medical education. There are,

so far as I can see, only two ways in which knowledge can be imparted to them. The first, through medical journals and medical meetings, has been tried and found wanting. The syphilologists of the country have done and are doing their part; indeed, some of us have written and talked so much as to have been diagnosed as afflicted with *diarrhea ex oribus*. Nevertheless, efforts along these lines should be both continued and expanded.

The second is a method which has so far hardly been tried, but in which public health officials themselves should figure largely. The health officer is *par excellence* the physician who is in constant contact with every other physician in his community. He bombards us monthly, weekly—nay, sometimes daily—with bulletins as to infantile diarrhea, measles, undulant fever, etc.; he has been responsible for inaugurating the wholesale immunization of children against diphtheria, scarlet fever, and even tuberculosis. In Baltimore, in the monthly bulletins sent out by the Health Department to every physician, syphilis (or the venereal diseases) were allotted 9 pages of space out of a total of 234 pages during the past 2½ years, as contrasted with 11½ pages for the vastly less prevalent and less serious but socially more appealing diphtheria.

Let the public health officer now recognize that syphilis is his major infectious disease problem. Let him add to his bombardment a steady stream of literature urging the more widespread use of free Wassermann service, of free arsphenamine when it is available. Let him teach us, with constant repetition of short summaries, such accepted procedures of treatment as those advocated by the Coöperative Clinical Group, how to use drugs in treatment, the desirability of epidemiological study of each case, the reasons for spinal fluid examinations, for the examination and treatment of pregnant women. Let him

realize that constant emphasis and repetition will accomplish educational results unattainable by a single address to a medical society, and that a program of this sort, if undertaken, should be kept up for years. Finally, let him clean his own house by making certain that his own syphilis clinics meet a minimum required standard of excellence, that the physicians employed in them are employed because they know something about syphilis, not because they need the job and happen to be friends of State Senator Doe. Let him offer, if local laws allow, his own clinics as instruction centers to practitioners, who may, by a few weeks' volunteer work, learn to handle the disease better (and incidentally more profitably) in their own patients.

Next, to face the problem of how to get the patient with syphilis into the hands of the presumably instructed physician or clinic. This involves, as I see it, two elements. It is essential to eliminate the quack advertising specialist and drug store treatment. Where laws permitting such action exist, they should be utilized; where they do not exist, their legislative passage should be urged by every possible means. Suppression of quackery is capable of accomplishment by legal means in an intelligent civilization: *vide* Denmark, which has had no quacks or cultists for more than 100 years; or even by extra-legal means, as one dynamic health officer in a northern New York city discovered. More important than this, however, is to find some way of bringing together the physician and the infected person who does not know he is infected or who thinks that he has been cured as a result of previous inadequate treatment. Here there are several avenues of approach. One is the urging of the routine Wassermann test upon hospitals which do not now employ it, and upon physicians engaged in industrial medicine. The facilities of

health department laboratories should, if necessary, be offered for this service. Better still is an advertising campaign, carried on in toilets, rest rooms, trains, hotels, industrial plants, similar to that sponsored for a brief period during the war by the Army, Navy, and the United States and local Public Health Services—and under the stress of war emotion accepted without criticism by the medical profession, only to be dropped at the war's end. It is even desirable, I believe, to utilize newspaper advertising in a fashion similar to that of the Public Health Institute of Chicago, though I think that the initiative in this respect should come from a combination of the local health officials and the local medical society. It is unanswerably true that, stimulated by such advertising, many infected persons with early and latent syphilis seek medical advice and attention, who otherwise would come into the hands of the physician, if at all, only after serious late lesions had developed. How many individuals are saved from infection by these patients, or how much money is saved by the prevention of progression through treatment, can only be conjectured, but to anyone familiar with wartime conditions throughout the country, or with the present local situation in Chicago, the saving in both respects would be obviously enormous.

To inject the note of profit into a discussion of medical practice is a heinous sin, the enormity of which I realize. And yet, money, or its lack, is the rock on which even the best instructed medical profession splits in the practical management of the syphilis problem. It is hardly necessary to point out that the treatment of syphilis is expensive, and that, even at depression fees, the minimum cost in private practice of the management of an uncomplicated early case is not less than \$200, and more likely \$350. It is estimated that even in normal times, only 20 per cent of

the infected population can afford to pay for the adequate care of syphilis at the usual private rates; perhaps an additional 50 per cent could meet the cost of care at a pay clinic; and that fully one-third must receive treatment free or for nominal amounts.

As to the 20 per cent under treatment in private practice, would it be amiss to point out to the practitioner that the economic is as important as the medical aspect in planning treatment for the syphilitic patient; that if the patient has only \$100 in all, it would be better for him to go to a free or part-pay clinic at the start rather than after having spent the whole \$100 on 6 weeks of treatment when he needs continuous care for a total of 18 months; that to compensate for the loss of this \$100 revenue, the practitioner might make up as much or more again if he actually looked for more frequently—and found, as of course he would—syphilis in his more well-to-do clientèle? Would it be amiss to suggest that more frequent use of the routine Wassermann would at one time serve the public health aim of uncovering and bringing under treatment the unsuspected syphilitic and the personal aim of improving his own income?

For the 50 per cent who can pay part or all of the actual cost of treatment, but not including a profit for the physician, such facilities as now exist are almost wholly for the lowest incomes of the group. There are many hospital clinics at which treatment is available for a charge of \$.25 to \$1 per visit. Most of these are run on the mass treatment plan, with no privacy, with intermingling of the sexes and races, and under circumstances so distasteful to the more gently born patient as to preclude his regular attendance. For the individual who can afford something better than this, but who is not quite up to the minimum average fee of private practice, there are, with only

three or four exceptions, no facilities whatever available in this country. Such patients are faced with the alternatives of abandoning treatment at private hands because of inability to pay for it, or of accepting the long waits, the hurried attention, the personal indignities of the average part-pay or free clinic. The Public Health Institute in Chicago has blazed a trail which the rest of the medical profession has so far been loath to follow. It has provided first-class professional attention under conditions resembling private practice at a cost level below the minimum attainable in private practice, and yet it has been able to operate either at a profit or at only a small loss. Such clinics should be available in every large center. When possible, they should be conducted under the joint auspices of the local medical society and a large general hospital. They are, of course, anathema to many practitioners, who fear loss of income; but have we not reached a stage in the syphilis problem where considerations of the private practitioner's income are secondary to those of the public health?

Finally, the free clinic services of the country should be largely expanded. In Baltimore, the only clinics which provide completely free treatment are those run by the Health Department. At the general hospital clinics, that run under the auspices of the University of Maryland Hospital (a state institution) is almost entirely pay, a curious and anomalous situation; while that at the Johns Hopkins Hospital is about 70 per cent free and 30 per cent small fee. The city clinics and the Johns Hopkins clinic are completely unable to deal with the problem of the indigent syphilitic with their present facilities; many patients must be turned away without any treatment at all! This is an appalling situation, which cannot be allowed to continue. Money must be found to treat every syphilitic patient, whether or not

he can afford to pay for it himself. This is a civic responsibility which cannot be dodged. Health officers must familiarize themselves with the needs of their communities and must obtain the necessary funds. If unsuccessful single handed, they must invoke the aid of prominent physicians and laymen in bringing to bear the pressure of enlightened public opinion.

What is the community cost, the burden to the tax payer, if the urban health department establishes a division of venereal diseases adequate to provide for Wassermann service to physicians, and free clinic service to all indigent syphilitic patients, whether infectious or not? So far as syphilis is concerned, and leaving out of consideration the cost of care of the frequently associated gonorrhea or chancroid, it is estimated that such a department may be efficiently run for an average cost of \$.60 per patient visit. This estimate includes salaries for administrative and professional personnel, nursing, clerical and social service, the overhead cost of laboratory and clinics, and the cost of drugs and supplies. While it is quite impossible to set definite figures for the average amount of treatment to be given to patients in such widely divergent conditions as seronegative primary syphilis and tabes dorsalis, it is certain that the average patient will not receive more than a total of 40 treatments. Taking this figure, which is probably optimistically high, as the average, and assuming that this amount of treatment is given within one year, the cost per patient per year is \$24. In Baltimore, a city and suburban area of approximately 900,000 people, it is further estimated that there are discovered each year about 9,000 new cases of syphilis, early or late: that approximately 1,800 of these are treated by private physicians, and 3,600 (half of the remainder) at clinics other than those of the Health Department. To manage adequately the re-

maintaining 3,600 (which at present is not being done) would cost the community \$86,400, in place of the \$39,000 now expended. If no privately endowed clinics existed and the entire burden of clinic service were thrown on the community, this figure would be nearly doubled. For the benefit of health officers generally, it is perhaps better to express the probable cost in terms of units of 1,000 syphilitic patients to be treated. The fewer the patients, the higher the cost, because of increased overhead; but I believe that a community cost of \$25,000 per year per 1,000 patients is adequate to provide ample treatment facilities. It is to be noted that this estimate is far below that supplied by Parran in the 1932 *Report of the New York State Health Commission*.⁷

The Medical Society of the District of Columbia has appointed a subcommittee to consider the local venereal disease problem and this committee has submitted a preliminary report⁸ which has been unanimously approved by the membership of the Society. This report, while it refrains at present from making any definite recommendations, clearly suggests in what direction those recommendations when made will be. The report discusses all of the shortcomings of our present haphazard system set forth here and says:

From all of the evidence at hand your committee does not see how we can escape the conviction that this . . . matter must be placed in the hands of the state, so that it can, with the assistance of the medical profession, apply the knowledge already in the hands of the profession to put this disease (syphilis) under control just as it has done other epidemic diseases and just as it would have done with syphilis long ago, had it been an acute infectious disease, instead of a chronic one. Has any plan, short of State control, been successful? The answer is "No." Has any State control plan been successful? The answer is clearly "Yes."

This comment refers, of course, to the enormous reduction in syphilis mor-

bidity accomplished particularly in England and in Denmark; and brought about, it is believed by competent observers, by the nation-wide adoption of one single measure—free treatment for all patients with venereal disease regardless of their ability to pay.

While I am willing to agree with the Washington Committee that all plans of syphilis control so far tried in this country have failed, I am not yet prepared to admit that the medical profession cannot drag itself out of the morass of failure. To do so, however, we need to end the conspiracy of silence among ourselves and with the laity. We need to raise our heads, plunged ostrich-like into the sands of concealment; to bring our problem out into the open; to talk about it among ourselves and with the intelligent laity, not only as a potentially crippling and fatal disease (the spread of which menaces every one of us), but also—since the average individual does not greatly fear physical disaster in the remote future—in terms of dollars and cents. Where the tax payer refuses to become alarmed as to the possibility of his own blindness or insanity 20 years hence, he will wince with pain at an increase in the figure in the lower right hand corner of his tax bill. He can be made to see that \$1,000 spent on the control of infectiousness in syphilis will ultimately save 10 times as much. The public health officer is the physician who must take the lead in breaking down this conspiracy of silence. I believe that he will find the bulk of the medical profession ready and anxious to help him.

In so far as syphilis control is concerned, we are faced with a situation in which we must improve our status both as physicians and as economists. We must effect not only a widespread betterment in the way in which the disease is managed but also in the way in which that management is paid for. Unless we are equal to both of these

tasks, there remain but two alternatives: to continue the conspiracy of silence, to make no progress in the control of the major infectious disease problem; or, by the breaking down of the conspiracy and the awakening of an enlightened public opinion, to see the problem taken from our hands and given over to those of the State. Perhaps one of these two alternatives, both distasteful to all physicians, is inevitable. The effort to avoid them, led by public health officials, is worth the trial.

REFERENCES

1. Parran, Thomas. The Eradication of Syphilis as a Practical Public Health Objective. *J.A.M.A.*, 97:73, 1931.
2. Williams, Huntington. Personal Communication.
3. Clark, Taliaferro, and Usilton, Lida J. Survey of the Venereal Diseases in the City of Baltimore and the Four Contiguous Counties. *Ven. Dis. Inf.*, 12:437, 1931.
4. Loeffler, H. C. *Costs of Venereal Disease to St. Louis*, Missouri Soc. Hyg. Assn., Jan. 1, 1933. 44 pp.
5. Exner, M. J. Report on Instruction Regarding Syphilis in American Medical Schools. *Am. J. Syph.*, 17:449, 1933.
7. Parran, Thomas. *Report of the New York State Health Commission, Albany, 1932.*
8. Hough, W. H. The Venereal Disease Problem (followed by Report of the Sub-committee on Venereal Diseases). *Medical Annals of the District of Columbia*, 3:107-109, 1934.

The President's Committee on Economic Security Appoints a Hospital Advisory Committee

THE Committee on Economic Security of which the Hon. Frances Perkins, Secretary of Labor, is chairman, and Secretary Wallace, Secretary Morgenthau, Attorney-General Cummings, and the Hon. Harry L. Hopkins, director of Federal Relief, are the other members, has asked the following hospital authorities to act as an advisory committee on hospital problems:

- Dr. S. S. Goldwater, F.A.P.H.A., Commissioner of Hospitals, New York City.
- Dr. Frederic Washburn, Director of Public Institutions, Boston.
- Dr. W. S. Rankin, F.A.P.H.A., Director of the Duke Foundation, Charlotte, N. C.
- Dr. Arthur C. Bachmeyer, Member A.P.H.A., Cincinnati General Hospital.
- Dr. Robin C. Buerki, Wisconsin General Hospital, Madison.
- Dr. Michael M. Davis, F.A.P.H.A., Julius Rosenwald Fund, Chicago.
- Rev. A. J. Schwitalla, President, Catholic Hospital Assn., St. Louis.
- Rev. C. C. Jarrell, President, Protestant Hospital Association, Atlanta.

- Mr. Robert Jolly, President, American Hospital Association, Houston.
- Dr. J. Rollin French, President, Western Hospital Association, Los Angeles.
- Dr. Winford H. Smith, Director, Johns Hopkins Hospital, Baltimore.
- Dr. N. W. Faxon, Director, Strong Memorial Hospital, Rochester.

This committee met in Washington on November 20, and an outline of some of the important subjects was presented by representatives of the Committee on Economic Security for the study and counsel of the Advisory Committee. The work of this committee will be of very large value to the entire hospital group, and future plans and future legislation looking to the important problems of hospital care, hospital support, and hospital development will be very carefully considered and such recommendations will be made to the Committee on Economic Security as a close and detailed study of these and other problems will warrant.—*Bull. Am. Hospital Assn.* VIII, 12 (Dec.), 1934.

Natural Immunization to Diphtheria in an Institution *

C. C. YOUNG, D.P.H., F.A.P.H.A., G. D. CUMMINGS, Ph.D.,
F.A.P.H.A., AND M. E. WILSON, M.D.

*Michigan Department of Health, Lansing, Mich.; and Michigan Home &
Training School, Lapeer, Mich.*

PREVIOUS diphtheria studies on institutional populations ^{1, 2} have indicated that a careful study of admission patients would be profitable.

We have observed two groups of patients in the Michigan Home and Training School for 1½ years to determine what effect herding might have upon immunity experience. Records of Schick tests, throat swabs, and blood antitoxin titers have been kept on both groups throughout the observation period.

The first series included 176 patients who had been admitted from 1 to 6 months before observations began. These patients were Schick tested and the antitoxin content of their bloods determined by the Fraser ³ modification † of the Römer test. Schick positive reactors were divided into three groups. The first, or test group, was not immunized; the second and third groups were treated with a sub-standard toxoid ‡ and a standard toxin-antitoxin mixture respectively. Three doses, a week apart, were given. The three groups, together with their Schick nega-

tive controls, were Schick tested, swabbed, and tested for antitoxin at 3 and 9 months after the last dose of antigen.

Observations were made on a second series of 213 patients within 1 month of admission so that institutional influences could be reduced to a minimum. These patients were Schick tested, swabbed, and bled for antitoxin determinations on admission, at 3 and 6 month intervals.

Our studies have revealed the following points:

1. The number of Schick positive reactors in the unimmunized groups was definitely reduced over the test periods and the reduction compared favorably with the reduction in the toxoid group, but not in the toxin-antitoxin group.

2. There were fewer Schick positive reactors than there were patients with blood titers of 0.01 units or below of antitoxin per c.c. at the beginning of the observations.

3. There were a number of Schick negative reactors with 0.002 units or below of antitoxin per c.c. of blood at the beginning of the observation, whose titers were increased at 3, 6, or 9 months.

4. The Schick test behaved as an antigen in some of these Schick negative reactors by raising their blood titers to a level comparable with the negative test.

REDUCTION OF THE NUMBER OF UN- TREATED OF SCHICK POSITIVE REACTORS

The number of positive reactors in the test group of the first series was

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

† Blood sera were tested at four levels, namely, 0.002 units, 0.01 units, 0.05 units, and 0.1 units. Throughout this paper the phrase "or below" means to the next lower level.

‡ Diluted toxoid 6-7 flocculation units per c.c.

reduced by 35 per cent in 9 months. The number in the toxoid group was reduced 50 per cent, and in the toxin-antitoxin group 89 per cent during the same time. The number of positive reactors in the second series was reduced 29 per cent in 3 months, and 39 per cent in 6 months. The results for both series of untreated individuals were therefore comparable. Environmental influence plus the Schick test appeared to be nearly as efficient as the toxoid immunization, but only one-half as efficient as the toxin-antitoxin immunization.

The blood antitoxin titers of those patients whose Schick tests changed from positive to negative increased. There were 19 Schick positive reactors with 0.002 units or below of antitoxin and 3 with more than 0.1 units per c.c. at the beginning of observation. In 3 months, 8 of 22 titers measured more than 0.1 units of antitoxin per c.c., 2 were 0.01 units or below, and 5 were 0.002 units or below. All titers above 0.002 units, and 2 of the 5 0.002 units or below correlated with negative Schick tests. The 3 remaining titers

of 0.002 units or below, remained unchanged at 6 months, but the Schick tests became negative.

The 3 patients with initial positive Schick tests and more than 0.1 units of antitoxin retained the same blood titers for the whole observation period. However, the Schick tests of all 3 were negative at 3 months; but again positive at 6 months.

TABLE II
INITIAL POSITIVE SCHICK TESTS
AND BLOOD ANTITOXIN TITRATIONS

	% Schick Positive	% 0.01 Units or Below
Series 1	33.2	38.1
Series 2	35.7	51.0

COMPARISON OF INITIAL POSITIVE SCHICK
TESTS AND BLOOD ANTITOXIN
RESULTS

The level at which the Schick test should be positive was taken to be 0.01 or below units of antitoxin per c.c. so as to represent a level of actual measurement. This level is admittedly lower than that commonly accepted (0.03 units). However, it will be seen in Table II that the disagreement between the Schick test and antitoxin titrations would have been even greater if a level of 0.05 units or below had been selected. The difference recorded is therefore conservative. The difference in percentage in the first series is small enough to be statistical, but that in the second series clearly indicates that there must have been a number of Schick negative reactors with 0.01 units or below of antitoxin.

TABLE I
CHANGE IN ANTITOXIN TITER OF SCHICK
POSITIVE PATIENTS WHO BECAME
NEGATIVE IN 3, 6 OR 9 MONTHS

	0.002 Units or Below	0.01 Units or Below	0.05 Units or Below	0.1 Units	More than 0.1 Units	Missed
Initial	19				3	
3 Months	5	2			8	7
6 Months	3	1	1	1	1	3
9 Months		1	1		4	2

INITIAL NEGATIVE SCHICK TESTS WITH 0.01 OR BELOW UNITS OF ANTI- TOXIN PER C.C. OF BLOOD

Forty-four, or 11.3 per cent, of the 389 patients observed were Schick negative with 0.01 units or below of antitoxin.* All of the Schick negative reactors were still negative at 3, 6, and 9 months, but in 86 per cent of the cases, blood titers had increased markedly at 3 months.

The fact that the Schick test might serve as an antigen was kept in mind throughout this study. When Schick negative reactors with as little as 0.002 units of antitoxin were encountered, it became necessary to determine the part which the test played in the rise in blood titers.

TABLE III
CHANGE IN ANTITOXIN TITER OF SCHICK
NEGATIVE PATIENTS WITH 0.01 OR
BELOW UNITS OF ANTITOXIN PER
CUBIC CENTIMETER OF BLOOD

	0.002 Units or Below	0.01 Units or Below	0.05 Units or Below	0.1 Units	More than 0.1 Units	Missed
Initial	29					
	6	9				
3 Months	3	1	5	2	15	3
	2		4	3	5	1
6 Months	3		6	1	12	7

NOTE: Figures in upper right hand corner represent patients observed at 3 and 6 months. Figures in lower left hand corner represent patients observed at 3 months.

THE ANTIGENICITY OF THE SCHICK TEST

Blood samples were drawn immediately before the Schick tests were administered. Blood titrations were completed before the Schick tests were read and, where possible, additional blood

* The same Schick test toxin and Schick test control were used throughout the study. The Schick toxin was retested to assure us that Schick negative results were not due to impotent toxin. Blood sera with low titers on these Schick negative individuals were repeated to check the first results.

TABLE IV
CHANGE IN BLOOD ANTITOXIN TITERS
BETWEEN TIME OF ADMINISTRATION
AND READING OF
NEGATIVE SCHICK TESTS

	0.002 Units or Below	0.01 Units or Below	0.05 Units or Below	0.1 Units	More than 0.1 Units	Total
Admin- istra- tion	14	4				18
Read- ing	4	4	8		2	18

samples were taken at the time of reading. Blood antitoxin titers of 18 patients were determined at the time the Schick tests were administered and when read. Fourteen of 18 individuals showed increases in blood titer between administration and reading. Ten of the 14 showed titers above 0.05 units or enough to agree with the Schick negative readings. In 55 per cent of the cases, therefore, the Schick test itself appeared to be responsible for the negative results. Furthermore, the effect of the test could not be considered temporary because 17 of the 18 patients tested above 0.01 units at the next test.

DISCUSSION

It is well known that Schick positive reactors may become Schick negative in a diphtherial environment. Dudley⁴ has reported a 32 per cent reduction of Schick susceptibles in 3 months in a boys' naval academy in England. This corresponds with the percentage reduction reported here. Dudley found that there was a direct relationship between the number of Schick negative reactors in a group and their epidemic experience. Thus, those students who were present in the academy through two diphtheria epidemics were more Schick negative than those who had been exposed to only one. Both groups were more Schick negative than students on admission. His results indicated that

herd immunization took place only when diphtheria was present in epidemic proportions.

Diphtheria has not been epidemic nor even endemic in the Michigan Home and Training School since 1920, so that the environment of the two schools cannot be compared. The population of the school has been artificially immunized with the exception of the patients reported here.¹ The diphtheria bacilli isolated from patients hospitalized with septic sore throat, Vincent's angina, and from our concurrent throat cultures have been of low virulence or avirulent. This indicated that possibly herd immunization was taking place continuously through the medium of organisms of low grade virulence which had lost their ability to cause clinical diphtheria.

The carrier rate for the school has not been determined since 1920 (1.9 per cent). All patients are hospitalized upon admission, and routine throat swabs are taken. It is, therefore, possible to determine carrier rates for admission and hospitalized patients. In 1932, 3.5 per cent of hospitalized individuals (including admissions) were carriers, while the rate for 1933 was 2.9 per cent. These rates were probably lower than those for the whole institution. Dudley² has shown that 40 per cent of a group of boys were carriers for short intervals over a period of a year, while the carrier rate was 6.9 per cent, indicating that the rate does not measure the total of individuals infected over a given period.

Diphtheria bacilli were found in the throats of 2 untreated Schick positive individuals whose test eventually became Schick negative. We observed a third individual whose negative Schick test coincided with the presence of diphtheria bacilli in the throat. There had been 3 positive Schick tests at 3 month intervals before hospitalization. Five months after the last positive test,

this patient was committed to the hospital with a sore throat. The virulence pig did not die, but there was some evidence of a toxemia. The Schick test was negative. Diphtheria bacilli were not isolated from the balance of the patients whose Schick tests became negative.

We did not anticipate the discovery of the Schick negative reactors with less than 0.002 units of antitoxin. It was not possible to explain the presence of such small amounts of antitoxin in terms of herd immunity. The fact that the Schick test stimulated antitoxin production in certain of these individuals helped to keep the results obtained on a sound basis and indicated the immunological behavior of such a group in the presence of diphtheria. Their response to a given antigen would be so rapid that the emergency could be easily handled.

The effect of the Schick test on the antitoxin titer of Schick negative reactors suggests that the change from the Schick positive to the Schick negative state might be accomplished in the same manner. Would it not be possible for the Schick test or a series of Schick tests to cause a rise in blood titer which would result in a negative test? Glenny³ has indicated the marked effect of the secondary stimulus in the production of antitoxin. It seems more reasonable to assume that the primary and secondary stimuli have been supplied by diphtheria bacilli of some virulence and that a Schick positive individual might then become negative in response to a low grade infection or to a series of Schick tests. This type of Schick positive individual would fall into the group designated by Glenny³ as the Schick positive immune, that is, an individual whose response to an antigen was secondary with a rapid rate of immunization. It is our intention to study a group of individuals by observing blood antitoxin titers uninfluenced by the Schick test. A rise in

blood titer would then be directly attributable to environment.

It will be recalled that the toxin-antitoxin mixture appeared to have twice the immunizing power of the toxoid. The interpretation of these results must be qualified by the knowledge that a certain number of individuals would have become Schick negative without treatment. This in turn indicates that certain individuals are easier to immunize than others and that a preponderance of this type in one group and not in the other would radically alter the end results. We would then have to credit the individual and not the antigen. Quoting Glenny ⁵: "Such a statement as 'a single injection of a given antigen has rendered a man Schick negative in 6 days' is to be put to the credit of the man probably more than that to the antigen." The Schick positive reactors who became

Schick negative in the series reported, did so over a relatively short period. If the effects of herd immunization are such that a certain number are easily immunized while the remainder are only immunized through diphtheria or artificial immunization, then it is logical to assume that this remainder might serve as an excellent group for the comparison of antigens.

SUMMARY

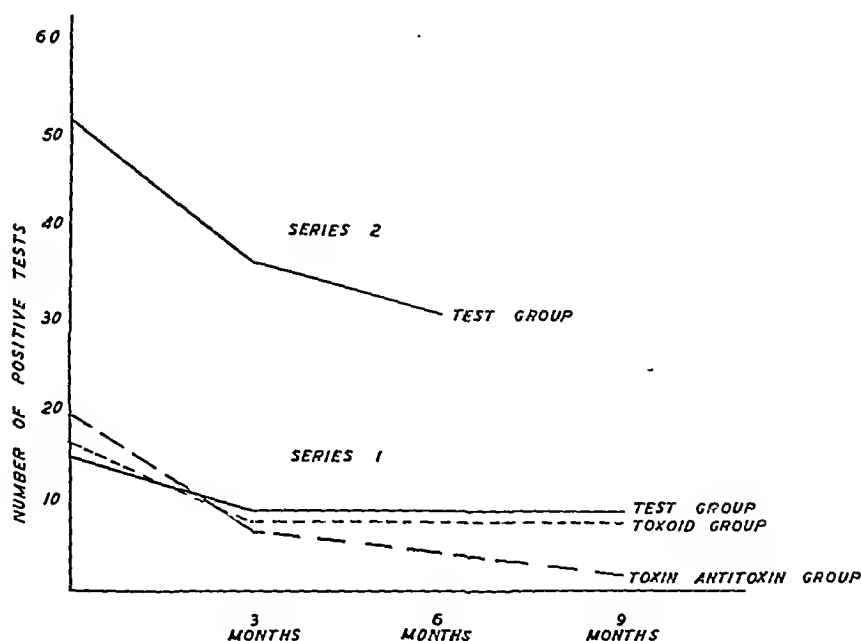
At the Michigan Home and Training School at Lapeer 389 patients have been observed by means of the Schick test, throat swab, and blood antitoxin titration at 3, 6, and 9 month intervals for evidence of herd immunization.

The number of Schick positive reactors in two series of patients was reduced 32 per cent at the end of 3 months without treatment.

Of 389 patients 11.3 per cent were

CHART I

REDUCTION OF SCHICK POSITIVE REACTIONS FOLLOWING
HERD OR ARTIFICIAL IMMUNIZATION



Schick negative, with 0.01 units or below at the beginning of the observation. Eighty-six per cent of the blood titers in this group had increased in 3 months.

CONCLUSIONS

The number of Schick positive reactors in a group is reduced by herd immunization over a relatively short period. A certain number of individuals exist whose antitoxin titer is too low to agree with their negative Schick test. These have the ability to respond rapidly to diphtherial antigen.

A comparison of artificial antigens should be carried out upon a group of Schick positive reactors with similar diphtherial history.

REFERENCES

1. Young, C. C., Cummings, G. D. *A.I.P.H.*, 22: 1151, 1932.
2. Young, C. C., Bunney, W. E., Crooks, M., Cummings, G. D., and Forsbeck, F. C. *A.I.P.H.*, 24:385, 1934.
3. Fraser, D. T., *Tr. Roy. Soc. Canada*, 25, Sec. V, 175, 1931.
4. Dudley, S. F., *Spec. Rep. Ser. Med. Res. Coun.* No. 75, 1923; *Ibid.*, No. 111, 1926; *J. Hyg.*, 32: 193, 1932.
5. Glenny, A. T. *J. Hyg.*, 24:301, 1925.

Wallace Will Fight for New Food and Drugs Bill

IN his annual report to the President—a document modest in size as judged by usual Government standards, consisting of only 119 pages—Secretary Wallace breaks the news that he, Professor Tugwell and others will enter the ring once more during the coming session of Congress in an effort to secure the enactment of a new food and drugs act. This is not exactly a sur-

prise, a semi-official announcement to the same effect having been made in *Printers' Ink* [Dec. 6].

But it is interesting as showing the Secretary's line of reasoning and indicating to merchandising interests that, whether they like it or not, some sort of bill is reasonably sure to be made law. . . . —*Printers' Ink*, Dec. 13, 1934.

Sources and Modes of Infection in Two Family Outbreaks of Syphilis*

A. L. GRAY, M.D., AND W. H. CLEVELAND, M.D.

*Epidemiologist, Mississippi State Board of Health, Jackson;
and Health Officer, Lee County, Tupelo, Miss.*

ACCORDING to Rosenau, syphilis was unknown before the year 1493. Within a few years after that date, it had an astonishing spread over the known world. It has continued its spread, retarded but little in its progress, in the human races. This, the great imitator, has been one of our greatest causes of suffering and an important cause of death.

Its clinical manifestations are well known, and the tremendous progress with regard to the treatment of the disease has been made within the present century. The social problems need no particular discussion. It is unfortunate, however, that this disease is too often thought of by both physicians and laymen as a venereal disease; and it is also unfortunate that treatment and the handling of the case is often clouded by the moral connotation attached to the word venereal. It would be far better if the common name for syphilis were greatpox and it were handled, at least from the point of view of the investigation of the source, as smallpox is handled. Too many of us as physicians have been content with reporting the case and then getting it under treatment, without being concerned with the possible source of this individual case, and with little thought to future cases of which the one under consideration

may be the source. Consequently, epidemiological investigations are rarely followed through in the hope of preventing further spread of the disease.

That this disease lends itself to the finding of sources of infection in the form of missed as well as known cases even more readily than does typhoid fever and other communicable diseases, is agreed to by many authorities. It is true that much less has been accomplished in dealing with it as to locating sources of infection than in the case of some other communicable diseases.

This paper is presented to call attention again to some of the sources and modes of infection of syphilis, and as an illustration of what may be accomplished in an epidemiological study of cases as they present themselves to physicians and health workers. The sources and modes of infection in the 2 family outbreaks as related below should recall to our minds that this disease has other methods of spread than through sexual intercourse and congenital acquisition, which may and probably often do play a major part in the propagation of the infectious agent within a family or community.

FAMILY OUTBREAK NO. I

In October, 1933, while making school inspections, the attention of the county health officer of Lee County, Miss., was called to a boy of the R.

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

family with an eruption. He was attending a rural school at the time. Upon examination, he presented what was apparently a typical generalized secondary syphilitic eruption. Communication with his parents resulted in a visit by the R. family to the office of the health officer. A study of the situation revealed that 6 of 10 members of this family had syphilis, the diagnosis of each case being confirmed by a blood Wassermann. Before the mode of entry of the infection into this family was determined, the father and mother accused each other of breaking the marital contract. When the investigation was completed, the following picture was gotten together:

In the R. family, A. R., female, age 17, began having sexual intercourse with a neighbor boy D. H., in November, 1931. D. H. had been in the health department office in July, 1931, at which time he had a chancre on the penis. Blood Wassermann on D. H. at this time gave a 2+ reaction. At the time of investigating this outbreak, D. H. could not be found.

A. R. gave a history of having had intercourse with D. H. at frequent intervals beginning about November 1, 1931, and continuing until June, 1932. She denied having had intercourse with anyone other than D. H. She gave no history of having had a primary lesion except for a period of about 1 month. In April and May, 1932, she had burning on urination in what was apparently the posterior wall of the vaginal orifice. It is probable that this burning was at the site of the initial lesion although no physician saw it.

About August 1, 1932, she developed what was apparently secondary lesions in the form of mucous patches on the mucous membrane of the throat, tongue, and gingivae. These were present for about 2 months but were not observed by a physician.

While A. R. had secondary lesions in

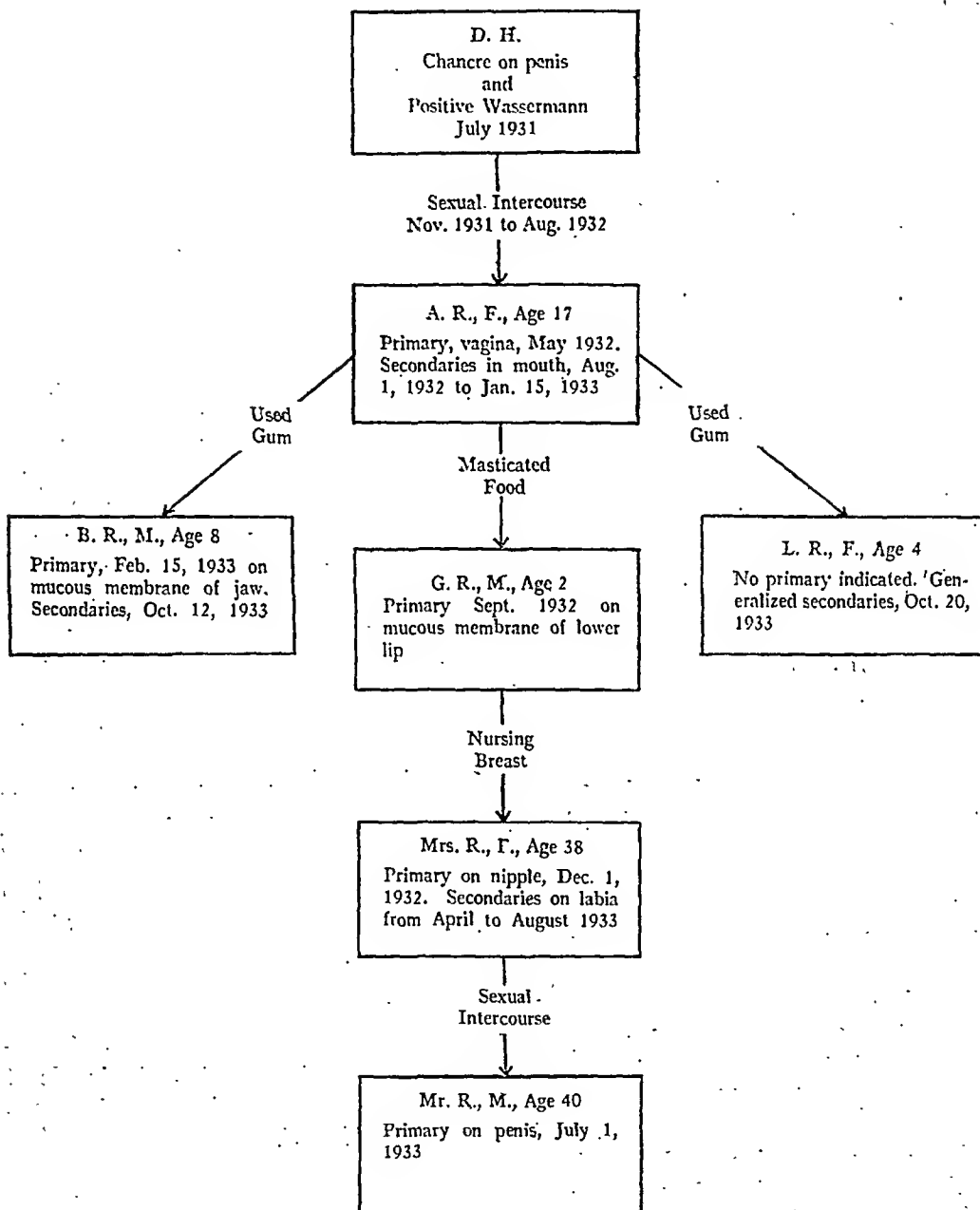
her mouth, she masticated food and gave it to her brother, G. R., age 2, who developed a chronic sore on the mucosa of the lower lip about September 1, 1932, which persisted for 3 or 4 weeks. He developed a generalized eruption November 26, 1932. He was still nursing at the breast of his mother, Mrs. R., at the time of occurrence of the sore on his lip and continued to do so until about March 1, 1933. Mrs. R., age 38, developed a chronic sore on one of her nipples in November, 1932, which was about 2 months after the sore appeared on the lip of her baby, G. R. She was told by her physician that this lesion, which persisted until March, 1933, was probably cancer. In April, 1933, Mrs. R. developed chronic sores about her vagina and in her mouth, which did not heal until the latter part of August of the same year. She had no generalized eruption.

Mr. R., age 40, developed a chancre on the penis July 1, 1933. This began healing only after treatment was started in November. He developed no secondary lesions.

B. R., male, age 8, was the school child from whom the investigation started. A history was obtained to the effect that A. R., the initial case in the family, gave this boy some gum which she had been chewing, transferring it directly from her mouth to his mouth. This occurred while A. R. had secondary manifestations in her mouth, which was from August 1, 1932, to January 15, 1933. Beginning about February 20, 1933, and continuing for about 1 month, B. R. complained to his parents of having a sore on the mucous membrane of his cheek. At the time of the investigation, a scar about 1 cm. in diameter was observed at the site indicated as being the location of the sore which was at the level of coaptation of the teeth opposite the first molar. He developed a secondary generalized eruption October 12, 1933.

FIGURE I

ILLUSTRATION SHOWING SOURCES AND MODES OF INFECTION IN OUTBREAK No. 1



L. R., female, age 4, gave no history of a primary lesion. However, she was also favored with some of the second-hand gum at the same time as her brother, B. R. She developed a generalized secondary eruption about

October 20, only a few days after the secondary eruption became manifest in B. R. It is probable that she got her infection through the gum at the same time as her brother, B. R. A. R. stated that she divided the gum which she

was chewing, giving one portion to B. R. and one to L. R.

To demonstrate more vividly the sources and modes of infection in this outbreak of syphilis, a graphic representation is given in Figure I.

A. R., the initial case, had a miscarriage November 26, 1932, delivering a fetus of about 6 months.

There were 4 other boys in the family, 6, 10, 15 and 19 years of age, all of whom had negative blood Wassermanns in October, 1933, when the investigation was started. There were no clinical symptoms in any of these.

Mrs. R. delivered apparently normal twins in April, 1934.

FAMILY OUTBREAK NO. 2

In the study of Outbreak No. 1, the investigators were led to the D. family because the attending physician of these two families felt that the original of 3 cases in the D. family probably got his infection from D. H., who infected the R. family. However, it was found that D. H. did not introduce the infection into the D. family.

Mr. D. with 2 neighbor boys went to Arkansas in early September, 1932, to pick cotton, and while there stayed in the same home. C. F., one of this trio, had been seen a few months earlier by the physician who attended the R. family mentioned in the discussion of Outbreak No. 1. Upon coming to this physician, C. F. presented a primary syphilitic lesion, the diagnosis of which was confirmed by a blood Wassermann. While the 3 were in Arkansas and for about 2 weeks prior to their going to this location, C. F. had a chronic sore throat for which he used a local application. This was probably a secondary lesion, but no physician saw him and made that diagnosis.

During their stay in Arkansas, these 3 individuals shaved only on Sunday mornings, using the same razor in rapid succession. Upon one occasion, Mr. D.

cut his chin slightly. He returned home early in October, and during the first 2 weeks in November developed a chronic sore at the site of the cut, which became about $\frac{1}{2}$ inch in diameter and persisted for more than a month. On January 1, 1933, he developed a generalized eruption which was diagnosed as measles, but which persisted until 3 weeks later when anti-syphilitic treatment was started. Mr. D. vehemently denied having had any sexual association with anyone from whom he might have gotten the infection.

Mrs. D. gave no history of having had a primary lesion. However, she developed secondary manifestations about February 15, 1933, consisting of a protracted sore throat accompanied by lesions of the tongue and gingivae.

While Mrs. D. had secondary lesions in her mouth, she masticated food daily and gave to her baby, age 3. This child had what was apparently a chancre on the tip of its tongue, beginning about March 20. When the investigation was made, there was a large scar at the site of this lesion.

The diagnosis in each of these 3 cases was confirmed by a blood Wassermann. Three older children in this family had a negative Wassermann and had had no clinical symptoms of syphilis at the time of the investigation.

In both of these outbreaks some of the epidemiological evidence as to sources and modes of infection was circumstantial. All information obtainable at the time of investigation, however, indicated that they were as outlined.

SUMMARY AND CONCLUSIONS

Family Outbreak No. 1—Case No. 1 was apparently infected by a neighbor boy by sexual intercourse. She apparently transmitted the infection to her baby brother by feeding it food which she had masticated while secondary lesions were present in her mouth. This child, case No. 2, had a

chancre on its lower lip, and, by nursing at her breast, infected its mother, case No. 3, who developed a chancre on her nipple followed by secondaries in her mouth and vagina. Case No. 4 developed a chancre on the penis apparently getting the infection from case No. 3, his wife. Case No. 5 was apparently infected by case No. 1, his sister, by chewing gum which she had chewed, resulting in a chancre on the mucous membrane of his jaw. Case No. 6 also chewed some of the same gum at the same time as case No. 5 did,

and developed secondaries at about the same time as case No. 5. No history of a primary lesion in this case was obtained.

Family Outbreak No. 2—Mr. D. was apparently infected through a cut by a razor used by a known case of secondary syphilis, a chancre developing at the site. Mrs. D. apparently became infected through sexual intercourse with Mr. D. She masticated food for her baby while secondaries were present in her mouth and the baby had the initial lesion on the tip of its tongue.

Active Immunization Against Poliomyelitis*

MAURICE BRÖDIE, M.D.

*Bureau of Laboratories, Department of Health, City of New York, and
Department Bacteriology, New York University and Bellevue
Hospital Medical School, New York, N. Y.*

THE problem that confronts the medical world concerning poliomyelitis is, What can be done for its prevention, or treatment in the acute stage, in the hope of warding off paralysis? In the treatment of the acute stage, we are no further advanced than when Heine described the disease as a clinical entity in 1840. In 1910, when Netter *et al.*¹ first announced that convalescent serum neutralized the virus of poliomyelitis, great hope was held that it had curative powers. Many reports have favored its use. However, as I have pointed out,^{2a} several significant controlled studies have failed to uphold its value. Moreover, our own experimental studies on monkeys showed that large amounts of convalescent serum or whole blood had no appreciable effect upon the progress of the disease, even if given during the earliest stages. The reason for this is obvious from studies on the pathogenesis of the disease, which show that it is confined to and transmitted along the nerve tracts of the central nervous system^{2b} by certain cells by which the virus is absorbed. This renders it highly improbable that the serum reaches the virus.

To prevent the epidemic spread of

the disease by means of isolation is difficult, for it apparently spreads mainly through carriers and abortive cases. As judged by the results of Davide³ and Brebner,⁴ passive immunity obtained by the use of convalescent serum offered some hope, but a recent report from California does not seem to justify this. Moreover, the serum is expensive and the immunity, if present, lasts for only a few weeks. Therefore, in view of the present state of knowledge and the difficulty in controlling the disease by other means, a safe and effective active immunization of the susceptible age group offers the most hopeful means of combating it, especially if immunity can be produced rapidly.

Experience with other virus diseases points to 3 possible methods of immunization. The first of these is by the use of an active virus which, through adaptation to one species, is non-infective for another, yet gives immunity to that species. Perhaps the best example of this is vaccinia virus. The second is by a combination of virus and serum, using an incubated mixture of active virus and antiviral substance, *e.g.*, yellow fever vaccine; or giving virus and serum separately, as in the case of cattle plague. The third method involves the use of germicidally inactivated virus, as in the case of dog distemper, foot and mouth disease, cattle and fowl plague, and rabies. Heat killed virus

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

has not proved satisfactory for the prevention of virus diseases.

In our experiments, the various methods of active immunization were investigated. *Macacus rhesus* monkeys were injected intracutaneously, in the abdominal wall, with the antigens. Some of the virus infiltrated into the deeper layer of the skin. Unless otherwise stated, a 10 per cent suspension of infective cord tissue was used prepared as previously described.^{6, 8} Similar concentration of virus suspension and methods of inoculation were used in the human cases.

Immunity was tested for some 3 to 6 weeks later by inoculating virus intracerebrally into the treated animals, and by testing for antibody by the neutralization test, which consists of mixing 0.9 c.c. of the serum with varying amounts of virus, incubating for 2 hours at 37° C., and after 8 to 10 hours on ice, injecting intracerebrally into other monkeys. In all instances, the neutralizing power of the serum or the resistance to direct intracerebral injection was estimated in terms of M.C.P. (minimal completely paralyzing) dose, which consists of the smallest amount of virus-containing-tissue causing a complete and rapid paralysis in *Macacus rhesus* monkeys weighing from 2.5 to 4 kilos, within 13 days after intracerebral inoculation of virus.⁵

Since the monkey is the only known experimental animal that is susceptible to the virus of poliomyelitis, one cannot determine whether monkey fixed virus is infectious for man except by direct inoculation, which is attended by risk. In the monkey, active virus produces considerable immunity the degree of which is proportional both to the size⁶ and infectivity of the dose.⁷ It was found that cord tissue harvested at the height of paralysis gave a better immunity than that obtained later, and a better protection than any other part of the cerebrospinal axis. However,

active virus proved to be dangerous, for occasionally animals developed mild non-paralytic and even severe paralytic forms of the disease. In some animals immunity developed in the absence of any tissue reaction as indicated by an absence of symptoms, cerebrospinal fluid, pleocytosis, or temperature changes during the course of immunization.

The specificity of the immunity was demonstrated by the fact that animals which received non-infective cord tissue failed to develop immunity.

The dangers attending the use of active virus in the monkey precluded its use in the human. Work on virus-serum combinations was carried out in conjunction with Dr. Alton Goldbloom, McGill University. The virus-serum combinations were given either as an incubated mixture, or separately, in which case the virus was administered intracutaneously and the serum subcutaneously, either before, with, or after the virus.^{8a} Both methods of administration gave immunity, and in the latter it was found that serum preceding virus gave a lower immunity than when administered with or after the virus. Further experimentation^{8b} showed that an excess of serum, that is, more than was required to prevent infection, reduced the immunity considerably. Inasmuch as the virus in serial passage changes in potency and since batches of convalescent serum are of different strengths, each must be titrated to arrive at a satisfactory balance. This entails the use of a considerable number of monkeys, rendering this form of immunization impractical.

The results with germicidally treated virus are rather contradictory. Phenolized virus has been reported to be dangerous and unreliable in its efficacy by some,^{9a, b, c} whereas Kraus¹⁰ and Erber and Pettit¹¹ reported favorable results. However, from the data presented, the virus used by the latter did

not appear to have been inactivated. Abramson and Gerber,¹² Römer¹³ and Jungeblut and Engle¹⁴ failed to demonstrate immunity with formalized virus.

The results of Abramson and Gerber¹² with heat killed virus and the results of Kraus¹⁰ and Erber and Pettit¹¹ suggest that the possibilities of vaccination with inactivated virus be reinvestigated. This is further borne out by the results obtained with

germically treated antigens in other virus diseases.

Throughout this work, the infectivity of the virus was checked by repeated intracerebral and intraperitoneal inoculation of large amounts of the germically treated virus. To inactivate virus, various concentrations of the germicide were mixed with the virus and kept either at ice box or incubator temperature. In each instance, double

TABLE I

Concentration of Cord Per cent	M.C.P. Dose Injected Intracerebrally	Temperature Ice Box (Centigrade)	Days of Contact between Virus and Germicide	Result
10	80	2.5	1.5	Paralysis 19 days
10	3,200 + 16,000 1 perit. retested in 10 days	5-6°	2.0	Slight rise in temperature
10	same	5-6°	3.0	No evidence of poliomyelitis
10	3,200 + 16,000 1 perit. retested for 3 consecutive days	0-4°	3.0	No evidence of poliomyelitis
10	3,200 + 16,000 1 perit. retested in 10 days	5-6°	4.0	No evidence of poliomyelitis
10	same	5-6°	4.0	No evidence of poliomyelitis
10	80	4.5°	3.5	No evidence of poliomyelitis
10	600	1-4°	10.0	No evidence of poliomyelitis
10	1,600	2-4°	11.0	No evidence of poliomyelitis
10	1,600	1-4°	10.0	No evidence of poliomyelitis
10	1,600 + 2,800 1 perit. and in 10 days 1,600 + 6,400 1 perit.	1-4°	10.0	No evidence of poliomyelitis
10	same	1-4°	10.0	No evidence of poliomyelitis
10	1,600 + 9,600 1 perit. retested at 2 day intervals for 6 days	2-4°	10.0	No evidence of poliomyelitis

the required amount of germicide was added to a 20 per cent cord suspension and, during the period of contact, the mixture was agitated frequently.

EFFECTS OF GERMICIDES UPON THE VIRUS OF POLIOMYELITIS

It was planned to treat virus suspension with merthiolate, ether, phenol, and formalin, and keep at ice box temperature. However, both merthiolate and ether were discarded because the virus was quite resistant to their action. Phenol in 2 per cent concentration appeared to inactivate the virus after 10 days.

A mixture of 0.3 per cent formalin and 10 per cent active cord suspension was tested after contact of 1.5 to 11 days at ice box temperature and was found to render the virus non-infective after 3 days. To test for virus in these mixtures, large amounts were repeatedly injected intracerebrally and intraperitoneally into *Macacus rhesus* monkeys. Careful observations of the animals, daily temperature readings, and frequent spinal fluid examinations were carried out, and only when all were negative, was the virus designated non-infective. This is demonstrated in Table I.

ACTIVE IMMUNITY EXPERIMENTS IN MONKEYS

A preliminary experiment showed the formalized virus to be superior to the phenolized, the latter being a cord suspension treated with 2 per cent phenol and kept at ice box temperature for 10 days. The animals received either 1 or 2 doses of the formalized virus, the second being given at 10 to 20 days after the first.

Experiments were then conducted with cord suspension treated with 0.3 per cent formalin for 10 days at ice box temperature, to determine the following points:

1. The best immunizing dose, by injecting animals with 2.5, 5, and 10 c.c. amounts, respectively

2. The comparative value of 1 and 2 doses, using 2.5, 5 and 10 c.c. amounts

3. The relative immunity produced with active and formalized virus

The summary of results is as follows:

1. Of 3 animals that received 2.5 c.c. of formalized virus, only 1 had demonstrable tissue immunity. All had neutralizing substances in their blood sera.

2. Of 12 animals given 5 c.c., 2 failed to show demonstrable tissue immunity, while 2 had a slight degree of immunity. Seven had a tissue immunity equal to or better than that developed by animals receiving a similar amount of active virus. All but 1 of the animals showed neutralizing substances in their sera.

3. Two of 11 animals inoculated with 10 c.c. of formalized virus failed to show a demonstrable tissue immunity. Only two showed resistance to direct intracerebral inoculation of virus comparable with that of the majority of animals which received 5 c.c. of the same material. Humoral immunity was present in the sera of all but 2 animals.

Thus 5 c.c. amounts appeared to give the best results. The use of 2 doses of antigen did not appear to be better than 1.

In the previous experiments 0.3 per cent formalized suspension was used after 10 days' contact with the virus, though it is inactivated after 3 days. In the present experiment, virus that had been in contact with the antiseptic for only 3 days was used. Eight animals were given 5 c.c. of a 10 per cent suspension—4 received a single dose, the others 2 doses 11 days apart.

The results obtained with material formalized for 10 days are given in Table II, and those of virus suspension formalized for 3 days in Table III. There is no obvious difference in the results. Thus, if at ice box temperature formalin is permitted to act for a longer time than necessary to inactivate the virus, it does not reduce its immunizing power.

The degree of tissue and humoral immunity obtained in 20 animals receiving 1 or 2 doses each of 5 c.c. of the

TABLE II
0.3% FORMALIN—10 DAYS—ICE BOX TEMPERATURE

No. Monkey	Course of Immunization	Result of Skin Inoculation	Direct Intracerebral Inoculations				Neutralization Tests			
			Test No. 1		Test No. 2		Test No. 1		Test No. 2	
			M.C.P. Dose	Result	M.C.P. Dose	Result	M.C.P. Dose	Result	M.C.P. Dose	Result
460	5 c.c. of 10% suspension	Erythema Swelling	2	No paralysis	4	Paralysis 17 days	6	No paralysis	2	Paralysis 8 days
405	"	"	2	No paralysis	5	Died 9 days, inter-current infection	1	No paralysis	1	Paralysis 9 days
589	5 c.c. of 10% suspension	Superficial necrosis	2	No paralysis	3	Paralysis 9 days	15	No paralysis	20	Paralysis 7 days
584	repeated in 10 days	"	1	Paralysis 11 days			15	No paralysis	25	Paralysis 7 days
590	"	"	1	Mild attack *	4	Paralysis 8 days	15	No paralysis	30	No paralysis
588	"	Necrosis Induration	3	No paralysis			20	No paralysis	3	Paralysis 27 days
558	5 c.c. of 10% suspension	Small necrotic area	1	Paralysis 12 days			5	Mild attack		
580	repeated in 14 days	"	1	Paralysis 16 days			20	No paralysis	30	Mild attack
581	5 c.c. of 10% and 2.5 c.c. in 14 days	Slight ulceration	2	No paralysis	3	Paralysis 7 days	10	No paralysis	15	Paralysis 15 days
491	5 c.c. of 10% repeated in 14 days	Induration and slight superficial necrosis	2	Paralysis 8 days	3	Mild attack	6	No paralysis	4	Paralysis 6 days
24	"	"	2	No paralysis			2	No paralysis		

* Rise temperature; cerebrospinal fluid pleocytosis

Average intracerebral resistance 1.7 M.C.P. doses

Average neutralizing power of 0.9 c.c. of serum 13 doses

TABLE III
0.3% FORMALIN AT ICE BOX TEMPERATURE FOR 3 DAYS

No. Monkey	Course of Immunization	Result of Skin Inoculation	Direct Intracerebral Inoculations				Neutralization Tests			
			Test No. 1		Test No. 2		Test No. 1		Test No. 2	
			M.C.P. Dose	Result	M.C.P. Dose	Result	M.C.P. Dose	Result	M.C.P. Dose	Result
657	5 c.c. of 10% formalized suspension, repeated in 11 days	None	1	No paralysis	2	Mild attack	5	No paralysis	10	Paralysis 10 days
678	"	Superficial necrosis	1	No paralysis	2	Paralysis 11 days	3	No paralysis	5	Paralysis 8 days
668	"	Skin excoriation	1	Mild attack*			5	No paralysis	10	Paralysis 9 days
677	" repeated in 14 days	Slight necrosis	2	No paralysis	3	No paralysis	20	No paralysis	30	Paralysis 6 days
694	5 c.c. of 10% suspension	None	1	No paralysis	2	Paralysis 9 days	20	No paralysis	30	Paralysis 14 days
676	"	Superficial necrosis	2	No paralysis	3	No paralysis	3	No paralysis	5	Paralysis 10 days
664	"	Moderate necrosis	1	No paralysis	2	Paralysis 9 days	15	No paralysis	20	No paralysis
666	"	Superficial necrosis	2	No paralysis	3	Paralysis 9 days	15	No paralysis	20	Mild attack

* 668 cerebrospinal fluid, electrocorticogram and size of brain normal.

* 668 cerebrospinal fluid pleocytosis and rise in temperature

Average intracerebral resistance 1.7 M.C.P. doses

Average neutralizing power of 0.9 c.c. of serum 10 M.C.P. doses

TABLE IV

No. Animals	Previous History	Resistance to Direct Intracerebral Inoculation		Neutralizing Power of Serum		
		Less than 2 M.C.P. Doses	2 M.C.P. Doses	3 M.C.P. Doses or more	Neutralizing Power of Serum	
					Less than 5 M.C.P. Doses	5-20 M.C.P. Doses
20	Formalized virus suspension 1 or 2 doses of 5 c.c. each	10	4	6	6	9
3	Active virus suspension, 2 doses of 5 c.c. each	1	2	0	-	-
5	Convalescent from severe attack	0	2	3	-	-
5	Convalescent from mild attack	5	0	0	4*	0

* Serum of only 4 animals tested

(b) that of convalescent monkeys. The latter group consisted of 5 animals which had definite paralysis, 4 with considerable residual paralysis and 6 others that showed clinical manifestations of the disease, with or without paresis. The results are summarized in Table IV.

It is evident from this table that the degree of tissue resistance developed by animals given formalized virus compares favorably in at least half the animals with that developed by animals given like amounts of active virus. Moreover, in half of the animals, the immunity compared favorably with animals recovered from a severe attack of the disease. Almost all the monkeys had a better immunity than those recovered from mild attacks of poliomyelitis.

On the other hand, the degree of humoral immunity was much lower in animals treated with formalized than with active virus and also lower than that of monkeys recovered from severe attacks of the disease, but decidedly better than that of animals recovered from a mild attack of the disease.

These experiments have demonstrated conclusively that an appreciable immunity can be developed by formalized virus, as indicated by the resistance of the animals to direct intracerebral inoculation of virus and the presence of antiviral substances in the blood stream.¹⁵ Because of the amount of skin irritation, and even necrosis, resulting from the formalized antigen, it was decided to use lower concentrations of formalin at incubator temperature. Ten per cent cord suspensions were treated with 0.1 per cent and 0.2 per cent formalin, respectively, at 37.5° C. The former concentration of antiseptic inactivated the virus in 12 hours and the latter in 6 hours.

Eleven animals received either 1 or 2 doses each of 5 c.c. of 10 per cent suspension inactivated with 0.2 per

formalized vaccine, was compared with: (a) that developed by animals receiving similar amounts of active virus, and

TABLE V

Name Initials only	Age	Weight (lb.)	First Inoculation of Vaccine		Second Inoculation of Vaccine		Neutralizing Power Serum Before Immunization M.C.P. Doses	Neutralizing Power Serum After Immunization M.C.P. Doses
			Date	Amount and Route Inoculation	Date	Amount and Route Inoculation		
B	1	21	7/18/34	2 Intracutaneously 3 Subcutaneously			20	40 to 80+
C	2	23	7/18/34	3 Intracutaneously 2 Subcutaneously			1 to 4	60 to 80+
W	3	40	7/18/34	1/2 Intracutaneously 4 Subcutaneously			15	120+
C.G.	4	35	7/18/34	1.5 Intracutaneously 3.5 Subcutaneously			40-60	120+
E.S.	4	30	7/20/34	2.5 Intracutaneously 4 Subcutaneously			3 to 5	120+
A	2	31	7/20/34	2.5 Intracutaneously 4 Subcutaneously	7/31/34	1.5 Intracutaneously 3.5 Subcutaneously	20	120+
O	2	27	7/18/34	3 Intracutaneously 2 Subcutaneously	7/31/34	2 Intracutaneously 3 Subcutaneously	less 5	120+
H	3.5	33	7/18/34	1/2 Intracutaneously 4/5 Subcutaneously	7/31/34	1 Intracutaneously 4 Subcutaneously	5 to 15	80 to 120+
O'D.	3.5	30	7/18/34	1/2 Intracutaneously 3.5 Subcutaneously	7/31/34	5 Subcutaneously	10 to 15	120+
T.G.	4	37	7/18/34	5 Subcutaneously	7/31/34	2 Intracutaneously 3 Subcutaneously	60	120+
D.	5	40	7/18/34	1.5 Intracutaneously 3.5 Subcutaneously	7/31/34	2 Intracutaneously 3 Subcutaneously	3 to 5	40+
O.S.	6	43	7/18/34	2.5 Intracutaneously 2.2 Subcutaneously	7/31/34	1.5 Intracutaneously 4 Subcutaneously	10 to 15	80 to 120+

cent formalin. Five received that which had been kept at incubator temperature for 6 hours, the minimum time required to inactivate the virus, the other 6, virus suspension formalized for 24 hours. The animals receiving the formalized cord suspension, treated just long enough to inactivate the virus, developed an immunity quite comparable with that developed by those receiving virus suspension, inactivated at ice box temperature. However, the animals that received the over-treated virus (0-2 per cent formalin for 24 hours) developed less immunity.

Another lot of 6 animals received 2 doses each of 5 c.c. of virus suspension treated with 0.1 per cent formalin for 24 and 72 hours respectively. Five of the 6 resisted direct intracerebral inoculation of 1 or more infective doses of virus, and all showed some humoral immunity. There was no appreciable difference in the degree of immunity produced by 24 or 72 hour treated virus suspension. In both, the virus was over-treated and the degree of immunity was slightly lower than usual.

Although the number of animals is small, this work suggests that the virus should be in contact with the antiseptic for just the amount of time necessary to inactivate it in the incubator. Inactivated at ice box temperature, an addi-

tional week of contact between virus and germicide, does not diminish its antigenic power. Whether virus emulsion inactivated at ice box temperature could be stored for long periods, or whether when inactivated at incubator temperature, it can then be stored on ice, must be determined.

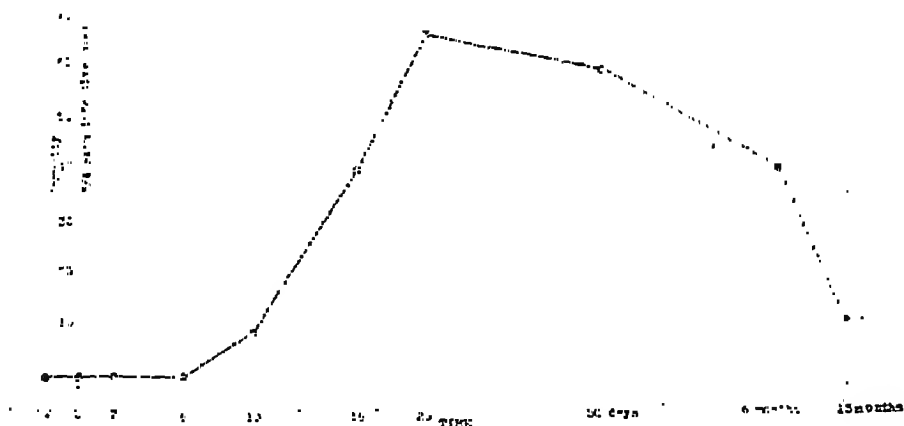
The 0.1 per cent formalized suspension gave but little skin irritation.

In the course of this work certain differences in the immunological response of animals to active and formalized virus were found:

1. The degree of immunity in the case of active virus was proportional to the size of the immunizing dose, the optimum response being obtained with 10 c.c. amounts; while with formalized virus, this relation was not definite, for 5 c.c. seemed as good if not better than 10 c.c. amounts.

2. With active virus, the degree of humoral immunity was decidedly higher than that of tissue immunity, as demonstrated by a comparison between the number of infective doses of virus neutralized by the animal's serum and the number the animal resisted by intracerebral inoculation. Therefore,^{8a} humoral immunity is more easily detected than is tissue immunity. With the use of inactivated virus, although the degree of tissue immunity obtained with 5 c.c. amounts often equalled that produced by a like amount of active virus, the neutralizing power of the serum was decidedly lower. Occasionally, in animals immunized with formalized virus, the tissue immunity was greater than that of the serum. In the case of active virus, there was usually

ANTIBODY CURVE 1



a correlation between the humoral and tissue immunity, not evident in the case of the formalized antigen. Normal cord tissue fails to induce the production of neutralizing substances for the virus of poliomyelitis. This tends to rule out the possibility that the higher neutralizing power produced with active virus may be due in part to a nonspecific substance elaborated in response to the injection of normal cord, and which is rendered inert by formalin.

3. Two doses of active virus, when properly spaced, gave decidedly better immunity than a single dose, but, using formalized antigen, 2 doses did not appear to be superior to 1 dose.

The next step was to determine the first appearance and then the subsequent rate of development of immunity. Inasmuch as the humoral immunity is decidedly higher than tissue immunity in animals receiving active virus, and since they correlate, it was decided to carry this out by following antibody curves in animals receiving active virus. After determining that the blood serum of monkey No. 380 had no neutralizing power for the virus of poliomyelitis, it was given intracutaneously approximately $\frac{3}{4}$ of a skin infective dose. Serum was collected after 2, 6, 10½, 16, 20, 30 days, 6 and 13 months, respectively, and the neutralizing power tested. The results are shown in Graph 1.

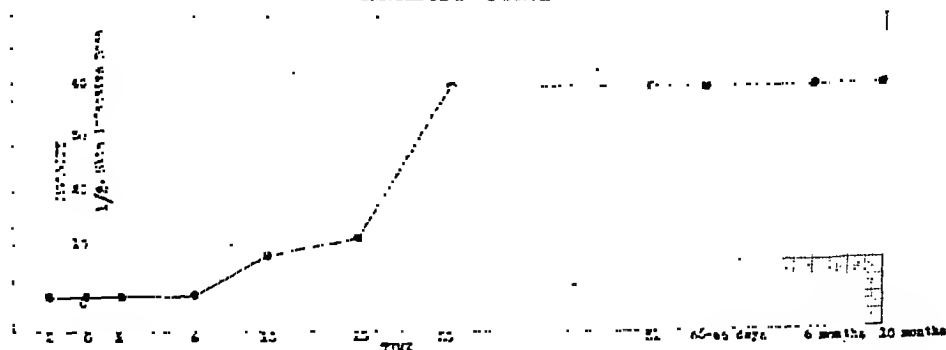
Following a period of at least 6 days, during which no antibody was demonstrable, it became evident between the 6th and 10th days, reaching its height by the 20th day, after which the

neutralizing power of the serum diminished so that after 6 months it was approximately $\frac{3}{4}$ and after 13 months $\frac{1}{6}$ of the maximum titre. At the end of 2 years immunity was still demonstrable. To confirm these findings, a second animal, whose serum showed no antibody, received approximately $\frac{1}{2}$ a skin infective dose. The results, given in Graph 2, confirm those of the first animal in showing a lag of about 6 days, with demonstrable antibody between 6 and 10 days, reaching its height about the 20th day. This animal maintained its full immunity for at least 10 months.

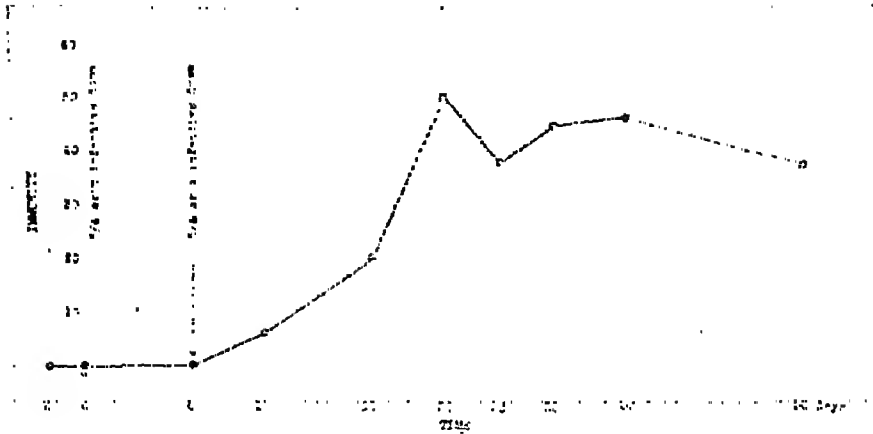
To determine the optimum time for giving the second dose, each of 4 animals, whose serums had no neutralizing power for the virus, received approximately $\frac{3}{4}$ of a skin infective dose of virus. Each monkey received a second inoculation given 6, 10, 14, or 20 days later. (As in the preceding experiments, the animals were bled at various intervals during the course of immunization and the serums were tested for virus-neutralizing substances.) The results, given in Graphs 3, 4, 5, and 6, show that when a second inoculation is given during the refractory period following the first, it does not produce much additional immunity, but given during the rise or height of antibody response to the first, considerable additional protection follows, especially if given during the rise.

Thus it seems that antibody develops

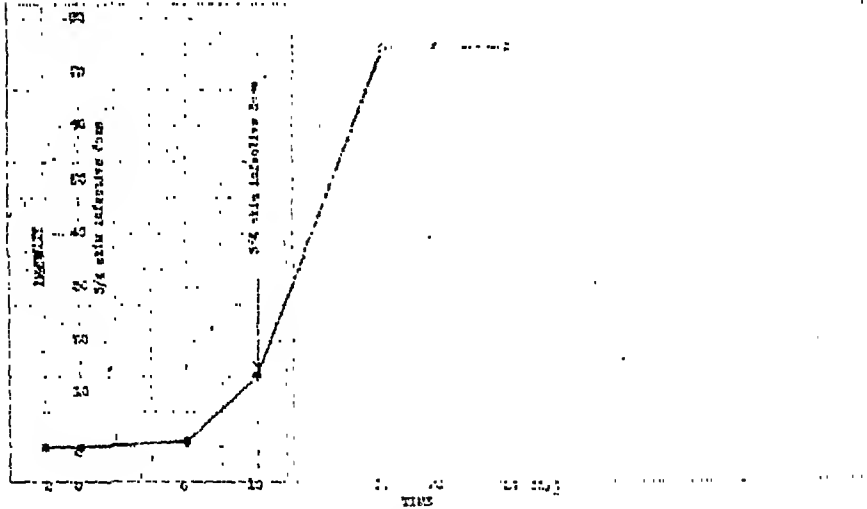
ANTIBODY CURVE 2



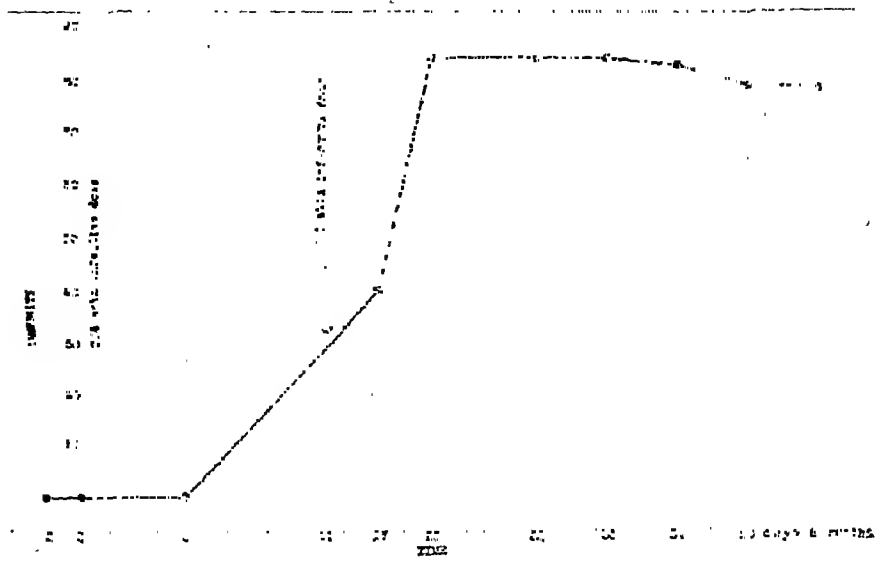
ANTIBODY CURVE 3



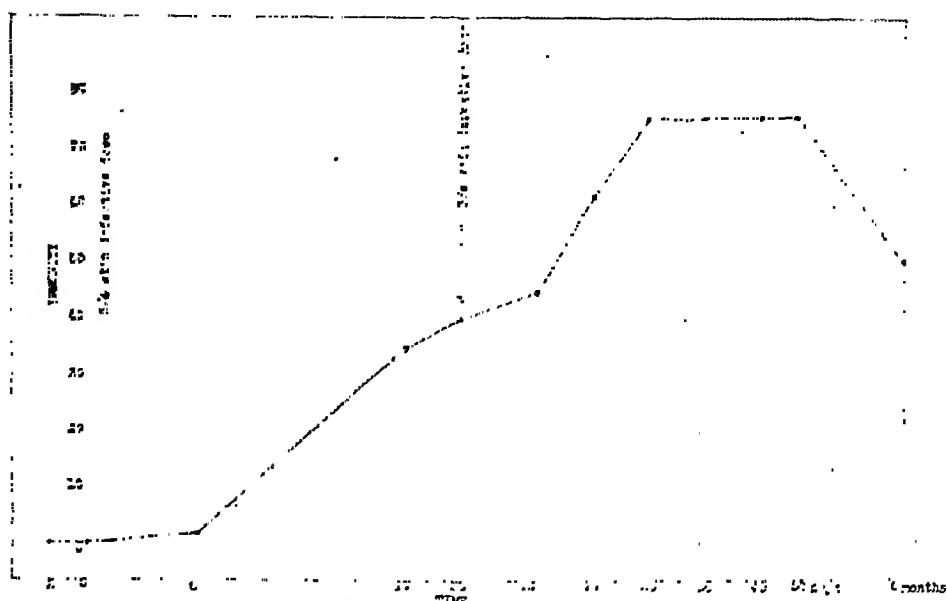
ANTIBODY CURVE 4



ANTIBODY CURVE 5



ANTIBODY CURVE 6



on the 6th day after inoculation, or soon after, and reaches its height in approximately 20 days. The best interval for the 2 inoculations is between 10 and 14 days. At present the only method of determining the success or failure of vaccination is the direct intracerebral test or the demonstration of antiviral substances in the animal's serum. Therefore, the erythrocytic sedimentation rate was followed in a series of 18 monkeys. The tests were carried out between the 7th and 20th days after the administration of antigen, the period during which immunity develops. It was found that of 15 animals which developed resistance to intracerebral inoculation of virus, 13 showed an increased red cell sedimentation rate. None of the 3 animals that failed to develop such immunity showed any change in the sedimentation rate. Inasmuch as the increase in rate might develop at any time between the 7th and 20th days, too many determinations would be required for practical purposes.

The animal experiments had shown that virus suspension inactivated with 0.1 per cent formalin was not only antigenic but also produced no harmful systemic or local reaction. Before attempting to apply it to the human, it

was necessary to determine whether the virus fixed for monkeys protected against recently isolated human strains. The literature upon this point is inconclusive. Burnet and Macnamara¹⁶ suggested that the strain isolated from a case in Australia differed antigenically from the animal passage strain they used, while Smith and McKie¹⁷ maintained that only differences in the virulence of the strains existed. On the other hand Weyer,¹⁸ Paul and Trask,¹⁹ and Flexner²⁰ suggested that there were immunological differences between recently isolated and monkey passage strains. However, Flexner²⁰ found that although differences existed, the passage virus protected against the recently isolated strains.

Therefore, animals actively immunized and convalescent from attacks with the Fl. monkey passage virus were inoculated with 2 recently isolated strains, 1 of which had undergone 3 and 4 passages through monkeys, and the other 1 passage. The tests were carried out quantitatively in terms of M.C.P. doses of virus suspension.

The sera of 2 animals actively immunized and of 1 monkey convalescent after infection with the passage strain were tested against 1 strain. A definite

quantitative difference was found between this strain and the passage strain, for the serum neutralized approximately only 1/10 as many infective doses of the recent passage virus as of the fixed virus. However, the convalescent animal showed no effects after the intracerebral injection of 5 M.C.P. doses of recent virus. One of 3 animals immunized with the Fl. virus and 3 convalescent animals showed a resistance to direct intracerebral inoculation of multiple infective doses of the second recently isolated strain. These findings are in keeping with those of Flexner²⁰ and indicate that the monkey passage virus immunizes against recently isolated strains, but that there is a quantitative difference. This appears to be more manifest in the humoral than in the tissue immunity.

It was then decided to test the vaccine on human beings. Before doing so on children, it was deemed advisable to try it upon ourselves, not that we had misgivings about the possibilities of infection, but to determine whether it would produce any disagreeable local or general reactions. Six volunteers from the Bureau of Laboratories were given 5 c.c. doses of 10 per cent virus suspension inactivated with 0.1 per cent formalin for 16 to 48 hours. Three were given 1 dose, 2, 2 doses, and 1, 3 doses. The second inoculation was given 11 days after the first, and the third, 8 days after the second. Those given a single dose were inoculated subcutaneously, while those given more than 1 inoculation received 1 to 2½ c.c. intracutaneously, the remainder subcutaneously. At the time of inoculation there was some soreness lasting but a few minutes and probably due to the formalin. Three of those injected had some induration for a few days, not painful or uncomfortable. No systemic or untoward reaction developed.

The blood sera of all 6 obtained before immunization were tested for anti-

body and the amount was determined by careful titration. Tests are now in progress to determine whether blood sera obtained between 3 and 4 weeks after immunization showed increased antibody. A preliminary determination on the sera of the 3 receiving more than 1 dose of vaccine suggests an increase. This must be rechecked and the amount of additional antibody must be calculated. The results on the other 3 have still to be obtained and when complete data are on hand, a comparison between the efficacy of 1, 2, and 3 doses will be available.

It was now evident that the vaccine could be administered with perfect safety and so it was given to 12 children, aged 1 to 6 years. Prior to the vaccination, the children were bled in order to determine the amount of antiviral substance in the serum of each.

The virus suspension used for preparation of the vaccine was cultured aerobically and anaerobically before it was treated with 0.1 per cent formalin for 16 hours, 12 hours being the time required to inactivate the virus. Five received a single dose of 5 c.c.; the others were given a second dose, either 11 or 13 days later. One to 2½ c.c. were given intracutaneously, the remainder subcutaneously, in the skin of the abdominal wall.

The children were observed for local and general reactions and temperatures were recorded 4 times daily. There was no apparent general reaction or discomfort and at no time any febrile manifestations that could be attributed to the vaccine. The amount of local reaction was negligible, consisting only of some induration in those receiving the larger amounts intracutaneously. Those receiving a second dose were not rendered sensitive by the first. The bloods were collected at 3 and 4 weeks after the beginning of immunization.

In each instance 0.9 c.c. of blood serum obtained in the control period was

tested against small amounts of virus to determine the level of neutralizing substances before immunization. The sera obtained 3 weeks after vaccination were tested in triplicate, against 40 to 120 infective doses of virus with simultaneous titrations of the virus as controls.

Table IV gives the age and weight of the children, the course of immunization, the antibody content of the sera in the control period and the results of the bleeding after 3 weeks (19 days in the case of K. S. and A.) as far as they have been completed. All 12 children showed the production of appreciable amounts of antibody or antiviral substances. So far, 2 sera have neutralized at least 40, 3 at least 80, and the other 7 at least 100 infective doses of virus.

Immunity was obtained by either 1 or 2 injections. It is too early to state which will give the greater protection. Whether or not the level of neutralizing substance in the control period affects the degree and rapidity of antibody production produced by the vaccine has still to be determined.

The antibody production was decidedly greater in the children than in the monkeys. If the vaccine which produces a relatively high tissue, but low humoral immunity in the monkeys acts similarly for human beings, the degree of protection obtained in these children should be quite appreciable.

Of course we have no index as to the level of immunity required to protect the children against natural infection nor whether the immunity obtained in these is sufficient. The tissue immunity in children cannot be tested, but as the monkeys treated with formalized virus showed a relatively high tissue immunity, sufficient in most cases to withstand intracerebral inoculations of virus, it is quite likely that the children have an appreciable tissue immunity. By analogy with louping-ill,²¹ a disease of sheep quite analogous to polio-

myelitis, it should be ample to protect against natural exposure to the virus, for formalized louping-ill virus was unable to protect sheep against intracerebral infection, yet did against the natural disease.

SUMMARY AND CONCLUSIONS

Of the various methods tried in *Macacus rhesus* monkeys, for the production of active immunity against the virus of poliomyelitis, virus suspension inactivated with formalin proved most satisfactory. Either 1 or 2 doses gave appreciable immunity and the degree compared favorably with the immunity developed by active virus or after convalescence. Five c.c. appeared to be a satisfactory dose.

A series of adults and children were then given the vaccine without any untoward local or general manifestations. It was shown that the vaccination gave an appreciable antibody response in the humans.

Whether or not the immunity is lifelong has still to be determined. Although longer intervals were not tested in the monkeys, immunity was present after 3 months with formalized virus and 2 years with the active virus.

REFERENCES

1. Netter, A., Gendron and Toraine. *Compt. Rend. Soc. de Biol.*, 70: 625, 707, 739, 1911.
- 2a. Brodie, M. *J. Immunol.* In press.
- 2b. Brodie, M., and Elvidge, A. R. *Science*, 79: 235, 1934.
3. Davide, H. Office Internat. d'hyg. pub., *Bull. mens.*, 1928, 20, 74.
4. *Poliomyelitis International Committee*, 1932. Williams & Wilkins, p. 529.
5. Brodie, M. *J. Immunol.*, 25:87, 1933.
6. Brodie, M. *J. Immunol.* In press.
- 7a. Brodie, M. *J. Immunol.*, 25:71, 1933.
- 7b. Brodie, M. *Proc. Soc. Exper. Biol. & Med.*, 30:1238, 1933.
- 8a. Brodie, M., and Goldbloom, A. *J. Exper. Med.*, 53:585, 1931.
- 8b. Brodie, M. *J. Exper. Med.*, 56:493, 1932.
- 9a. Aycock, W. L., and Kagan, J. R. *J. Immunol.*, 14:85, 1927.
- 9b. Deiner, C., and von Wiesner, R. *Wien. Med. Wochenschr.*, 60:2482, 1910.
- 9c. Levaditi, C. *Ecto dermoses neurotropes monographie de l'Institut Pasteur*. Masson, 1922.
10. Kraus, R. *Ztschr. f. Immunit.*, 69:424, 1931; *Wien. Klin. Wochenschr.*, 23:233, 1910.
11. Erber, B., and Pettit, A. *Comptes Rend. Soc. de Biol.*, 109:819, 1932.

12. Abramson, H. L., and Gerber, H. *J. Immunol.*, 3:435, 1918.
13. Römer. *Epidemic Infantile Paralysis*. Wood, 1913.
14. Jungblut, C. W., and Engle, E. T. *J. Exper. Med.*, 59:43, 1934.
15. Brodie, M. *Science*, 79:594, 1934; *J. Immunol.* In press.
16. Burnet, F. M., and Macnamara, J. M. *J. Australia*, 162:851, 1929.
17. Smith, R., and McKie, M. *M. J. Australia*, 11, 404, 1933.
18. Weyer, E. R. *Proc. Soc. Exper. Biol. & Med.*, 29:289, 1931.
19. Paul, J. R., and Trask, J. D. *J. Exper. Med.*, 58:513, 1933.
20. Flexnor, S. *J.A.M.A.*, 99:1244, 1932.
21. Gordon, W. S. *Proc. Roy. Soc. Med.*, 27:11, 1934; *Vet. Record*, 14:1, 1934.

Imagination in Public Health

" . . . It is inconceivable that such a prolonged and widely spread bodily infection (syphilis) should leave undamaged the vital procreative cells. In what way does this outlook relate itself to practical work? I have personally found it a great stimulus to a better realisation of the reasons for preventive action against the great systemic diseases. The constant thought of death rates and fatal disease is in the end rather depressing. It is like a fresh wind from the hills to conceive that we are, in fact, doing far more—that we are laying the foundations of a work which, in the generations still to come, will largely abolish these chronic indispositions that take so much away from the joy of life. It is true that we are still hampered by lack of knowledge in many avenues, and we wait upon research to show us the lines along which we can usefully apply scientific knowledge. What I do impress, however, is that we as field workers must keep ourselves constantly in touch with all scientific enquiry into such great systemic conditions. Only in that way can we

keep our minds living and appreciative of the trend of modern thought. Again, let me lay stress on this fact—that I am not talking eugenic ideals; I am filled with the thoughts of a practical vision; for our prime function is to guide the public in those ways which will deal effectively with the great causes of ill-health, disablement, and unhappiness. The field of thought which is opened up by such a generalisation of the effect of individual diseases is almost limitless, and it is obvious that a great correlation of what is ordinarily known as scientific medicine with accurate eugenic experiment would be needed to prove categorically what has been thrown out as a truly imaginative concept for your consideration. But it is such thoughts as these that make our work really interesting and constitute what, to my mind, is an orderly imagination of profound value in keeping us really alive and vigorous in mental outlook and capacity for change. . . ."—Dr. R. Veitch Clark, *Imagination in Public Health*, *Public Health*, Nov., 1934, p. 62.

Reduction of Maternal and Infant Mortality in Rural Areas^{*}

J. H. MASON KNOX, JR., PH.D., M.D., F.A.P.H.A.

*Chief, Bureau of Child Hygiene, Maryland State Department of Health,
Baltimore, Md.*

APPROXIMATELY 54 per cent of the inhabitants in the registration area of the United States live in the country or in villages and towns of less than 10,000 population. These rural and small-town residents comprise a larger proportion of native born Americans, white and colored, than is found in the cities. The infusion of young life entering the large centers of population each year comes in large part from these less congested areas. It is important, therefore, that measures intended to promote public health, to diminish illness and death, should at least be equally effective in both rural and urban areas.

The difficulties of carrying out public health procedures in the more sparsely settled parts of the country may be an explanation but not an adequate excuse for the greater protection afforded residents of cities.

MATERNAL HYGIENE

It is not the purpose of this paper to discuss in detail the causes of the high maternal mortality rates in this country. This has been done repeatedly by experienced obstetricians and public health officials. The defects of the present *laissez-faire* procedures have

been thoroughly exposed and the need of more thorough obstetrical training in the medical schools emphasized. Suffice it to say that each year approximately 16,000 comparatively young women die from puerperal conditions producing a maternal mortality of 7 per 1,000 live births.¹ This rate for the whole country has remained at about the same figure for a number of years. Two-thirds of these deaths are from sepsis and toxemia, conditions which are generally preventable. It is with no feeling of national pride that one records that when a Scandinavian woman comes to this country she doubles her danger of succumbing in becoming a mother.²

As is generally known, the figures of the Bureau of the Census indicate that the maternal death rates in rural areas are considerably lower than those in the cities, 6.2 vs. 7.8 per 1,000 live births in 1929.³ This difference in rate however is apparent rather than real and would disappear if the deaths of women, residents in the country and small towns, who come to city hospitals for delivery, were credited to their place of residence. Thus, according to the survey of maternal deaths made recently by the Children's Bureau in 15 representative states, 28 per cent of the women dying in city hospitals from puerperal causes⁴ were non-residents coming largely from rural areas and small towns. Non-resident maternal

^{*} Read before the Child Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

deaths in Baltimore, for example, increased the maternal death rate in the city from 5.9 to 6.8 per 1,000 live births. Last year 23 per cent of the puerperal deaths in Baltimore occurred among residents of the counties of Maryland outside of the city. A study of the maternal deaths in Maryland, exclusive of Baltimore, a few years ago, disclosed conditions which probably are equally true of much of rural America.⁵

As usual, 60 per cent of the mortality was due to sepsis and toxemia. Eighty-two per cent of these women were attended by physicians alone and but 10 per cent by midwives alone. Eighty-nine per cent of the women were married and 66 per cent had older children. Only 8 per cent received anything like adequate prenatal care, and 56 per cent had had no prenatal care whatever. Twenty-seven per cent of the total deaths occurred among women whose pregnancy was interrupted before the 7th month and who had not been under the care of a physician.

A tragic feature of this study was the large number of women who did not consult a physician until serious complications had intervened, usually too late for relief even in the most experienced hands. Surely such conditions which are not exceptional in rural America call for prompt attention and relief. Moreover, it is understood that the neonatal deaths occurring in the 1st month of life, comprising about one-half of the deaths in the 1st year, as well as the stillbirths, can be radically reduced only through more general and adequate prenatal, natal, and post-natal care of the mother.

INFANT MORTALITY

When we turn to a brief consideration of infant mortality in this country we have reason for greater satisfaction. A third of a century ago it is probable that 1 of every 6 infants born alive died in its 1st year. Sir John Simon

of England has asserted that a high infant mortality rate almost necessarily denotes a prevalence of those causes and conditions which in the long run determine a degeneration of race and are an indication of the existence of evil conditions in the homes of the people. Sir Arthur Newsholme has called the infant mortality rate the most sensitive index we possess of social welfare. A high infant death rate means the sacrifice not of the unfit, but of the unfortunate infants, those deprived of proper care.

In the volume on Infant Mortality published this year by the Bureau of the Census it is recorded that in 1930 out of 2,204,000 live births in the birth registration area in continental United States, comprising 94.7 of the total population, there were only 142,000 infant deaths under 1 year, giving an infant mortality rate of 64.6.⁶

The improvement can be seen best in a comparison of the rates in the original birth registration area from 1915 to 1930, inclusive. In 1915 there were nearly 76,000 infant deaths with a rate of 99.6 per 1,000 live births, whereas, in 1930 in the same area, in which the population had increased more than 7,000,000, there were but 43,000 infant deaths with a rate of 62.1 per 1,000 live births. While there has been a continuous reduction in the infant mortality rates during the last 20 years, in both urban and rural areas, the lowering of the rates in the cities has been the more marked.

The infant mortality rate in 1915 was 103.1 in the cities and 93 in the rural sections. The city rate gradually approached the rural rate and since 1925 it has been consistently lower, being 61.2 in 1930 versus a rural rate of 64.⁷

The more rapid reduction of infant deaths in the cities is due largely to the decrease in deaths from diarrhea and enteritis, the mortality rate from these diseases in the cities in 1917 being 23.9

and 6.8 in 1930. In the same period the rural infant deaths from the same causes decreased from 16.1 to 8.4 per 1,000 live births.⁸ This reduction of diarrheal deaths among infants in the large cities is illustrated in a comparison of Baltimore with the rest of the state consisting for the most part of a rural population. There were, in 1933, but 62 deaths from gastroenteritis in infants under 1 year in Baltimore, while in the counties outside of Baltimore, with an approximately equal population, there were 171 infant deaths from these disorders.

This experience is true of other large cities as compared to surrounding country areas. It indicates that the kind of care which keeps a baby well is not equally available in the rural areas and that disadvantages of crowded living conditions are compensated for by better environmental sanitation.

INFANT HYGIENE

Perhaps the most important factors which favor the well-being of the city infant are:

1. Pasteurized clean milk
2. Available infant welfare stations to which mothers of limited means can bring their infants for examination and advice from skilled physicians
3. Home visits by nurses to instruct mothers in the care of their babies
4. Sanitary disposal of waste and a reduction in the number of house flies

This kind of assistance is not so generally provided for the indigent rural mother, which explains in part why she loses a larger proportion of her babies than does the city mother of the same economic status.

When one seeks for a means for overcoming this disparity between the underprivileged infant in the congested districts in the city and the baby of the poor farmer living in the wide-open spaces, it may be profitable to recall the history of the maternal and child hygiene movement in this country.

LAY INITIATIVE RESPONSIBLE FOR THE MATERNAL AND CHILD HYGIENE MOVEMENT

The movement began in the large cities. It was due in a marked degree to the interest and vision of lay groups of interested, socially minded men and women, who became aroused by the suffering and loss incident to the excessive mortality among mothers and infants and took practical steps to improve conditions. Local volunteer organizations expanded into state and national associations which were tremendously influential in awakening public sentiment.

These pioneer activities were often directed by physicians whose experience and knowledge supplied the necessary medical background. The medical profession as a whole, however, was not particularly concerned. Influenced by an aroused public opinion, city boards of health generally followed the paths opened by the volunteer organizations and later depended upon lay support for help in the enactment of milk ordinances and of other measures which have furthered child hygiene.

ACCEPTANCE OF RESPONSIBILITY BY LOCAL, STATE AND FEDERAL DEPART- MENTS OF HEALTH

State departments of health gradually followed the lead of the city boards of health in this field. A great amount of valuable work resulted. Perhaps this very expansion of official activity has rendered it less evident to the influential citizens of rural communities that they have a personal responsibility to help prevent unnecessary deaths among women and children in their neighborhood. To them this seems to be the job of the local health officer and the public health nurse.

Certainly progress at present made in the field of maternal and infant hygiene in the cities would not have taken place had the sole responsibility been

assumed by the professional workers. But a fraction of our rural districts is served by trained whole-time health officers and nurses. Only those with experience in rural work know how difficult it is for a health officer, with 1 or 2 nurses, to carry on adequate maternal and infant hygiene work, in addition to his many other duties, in a scattered population in a large territory without the help and coöperation of interested residents who know and care.

DEVELOPMENT OF PUBLIC SENTIMENT ESSENTIAL TO SUCCESS

One of the important functions of a health officer, who is determined to lower the maternal and infant mortality rates in a rural area, is to develop active and efficient lay support of his undertakings. His personality and his ability to interest the public in his child health program may determine his success or failure in this field. This matter of organizing groups of influential citizens to further a community program in behalf of mothers and infants should be given more emphasis in our schools of public health in addition to the many technical and scientific subjects the embryo health officer is expected to master.

ORGANIZATION OF INTERESTED LAY GROUPS

Experience has repeatedly shown that even in sparsely settled communities which may seem indifferent to high mortality rates among mothers and infants there are always some persons, men and women, who can be interested and organized into a supporting group to sponsor better prenatal, natal, and infant care. Through such a group or committee, lay assistance may be furnished at a clinic, and transportation for certain cases provided. What is more important, through such groups there can be developed a sense of community responsibility for the health of women who are not able to care ade-

quately for themselves or their children. A volunteer organization of this kind grows in influence by the evident justice of the cause it sponsors. Its activities often result in securing additional assistance from public sources toward making environmental conditions more favorable for children.

MEDICAL PROFESSION AS ADVISORY AIDS

Naturally a community looks to its physicians to advise it in matters of health. Certainly individual doctors have played a leading part in the formation of child health organizations in the cities. This is true also in the planning of child health committees in rural areas. It must be remembered, however, that many physicians are rugged individualists, who devote all their time, often for little or no remuneration, to caring for patients who consult them. The sum total of the service they render is incalculable but it reaches a limited group and often does not have a large part in a community-wide plan intended to reach *all* mothers who are in need.

On another occasion the writer has stressed the importance of giving more emphasis in the curricula of our medical schools to the responsibility—not only to his own patients but to the community in which he has cast his lot—which devolves upon a physician by reason of the very knowledge he possesses.⁹ The most meticulous care by a physician of the women and children who consult him may not appreciably lower the morbidity and mortality rates in a whole community. These are largely determined by the lack of care of those who are too poor or too indifferent to call a physician promptly for illness, still less to seek his services in order to keep well.

NEED FOR PREVENTIVE AND CURATIVE SERVICES

The great need in rural America today

is that there be set up in every community some generally accepted plan which will make available both preventive and curative services for those who are not able to provide for themselves. Such a plan will take form when a group of responsible citizens organize for this purpose. It is, of course, desirable that the local health officer, if there is one, sponsor and direct such a movement. The lay public is ready for such action. The education of the laity in maternal and child hygiene is being actively promoted by state and city departments of health and national and state medical societies. Physicians giving professional services in a community-wide plan of maternal and child hygiene should receive fair remuneration.

SPECIFIC PROBLEMS INDICATED

Thus far we have discussed in general terms the present needs of mothers and infants in rural America. It is understood that each section of the country has special problems which must be met by specific measures. The variations in the maternal and infant mortality rates among the several states are sufficient proof of this assertion. In 1929 there were 6 states having a maternal mortality rate of 9, and 2 with a rate of less than 5, per 1,000 live births; in 1930 the infant mortality rates among the states ranged from 49 to 145.

SURVEY OF EXISTING CONDITIONS PRELIMINARY TO ACTION

Any adverse conditions existing in a community should be carefully studied by the proposed local child health committees under the guidance of the health officers and physicians, and appropriate remedies should be applied.

MIDWIVES

I am suggesting a few of the outstanding problems which must be faced in some rural communities in formu-

lating a child health program. Thus, in many rural areas in the South there is the midwives' problem. Steady progress is being made in eliminating the unfit midwives and in instructing those who practise. Even the better midwife, however, has definite limitations. She cannot examine her patient, give her prenatal care, or deliver her if she presents abnormal symptoms. Among the patients employing midwives, the prenatal clinics established by a number of local departments of health have proved of inestimable value. In these clinics the midwife's cases are examined and advised and if unfavorable conditions are found the expectant mothers are referred to physicians or hospitals.

DYSENTERY

In the South too, there are many rural areas in which dysentery is endemic and is the principal cause of a high infant mortality. Carefully controlled studies of this disease have been made recently in West Virginia by Dr. George M. Lyon of Huntington.¹⁰ He finds that from 15 to 80 per cent of all children of 5 years, including those of well-to-do parents, have had dysentery. The milk and water supplies are excellent and do not seem to be involved.

In the territories studied, including several counties in West Virginia, Dr. Lyon shows that the transmission of the disease may usually be attributed to the proximity of the infant to an active case of dysentery and to the unsanitary disposal of sewage, with flies as the most frequent carriers of the infecting agent. Poverty, unhygienic surroundings, and warm moist summer heat are favoring conditions. The importance of carriers in the dissemination of dysentery has been emphasized by McGinnes from studies in Henrico County, Va.¹¹

In situations of this sort, it is difficult for health officers to accomplish results unless they are backed by in-

telligently informed public opinion and have the support of lay organizations that are determined to remove the proven dangers to infant life.

EXCESSIVELY HIGH MORBIDITY AND MORTALITY RATES AMONG THE NEGROES

In the South too, our mortality statistics are affected unfavorably by a large negro population in which the morbidity and mortality rates are nearly double those of the whites. It has been repeatedly shown that these high rates are not necessary, that colored mothers and infants can be saved by the same methods that have proved effective among the whites, *i.e.*, that there is no demonstrated physical inferiority in the negro. He lives at present with lower moral and sanitary standards. There is reason to believe that if conditions were reversed the white mortality would be that of the negro today and the death rate of the negro approximately that of the white. The majority of the negroes live in country districts. Their condition has been improved in proportion as the leaders among them have learned to understand the steps by which the whites have mounted to higher levels of personal and public hygiene, and have been able to persuade an increasing number of their own race to follow.

There is one county in Maryland in which the negro infant mortality rate was much lower last year than that of the white. This was due in no small part to the coöperation the enthusiastic, intelligent, colored public health nurse in that county secured in the many households she visited.

MATERNAL AND INFANT CARE IN ISOLATED COMMUNITIES

That the lives of mothers and children in a so-called backward country area can be saved by those who know and are willing to lead, is nowhere better demonstrated than by the work of the

nurses of the Frontier Nursing Service in the Appalachian Mountains under the inspiring direction of Mrs. Mary Breckinridge. These mountain women have been helped to have their babies safely in a terrain without roads and amid primitive conditions. Similar organized effort would save women and infants now being lost in many rural areas much less difficult to traverse.

CLINICS IN RURAL DISTRICTS

Our experience in rural Maryland indicates that prenatal or child health consultations supported by a coöperative sentiment are effective means of reducing maternal and infant death rates. A special advantage of these clinics has been the discovery and successful treatment of a number of women with contracted pelves, with syphilis, or with threatened eclampsia. It is a reflection upon the social conscience of any community when complications of this sort are not discovered until it is too late to make the needed assistance available. When these clinics are established, a considerable proportion of the patients go to physicians of their choice for the treatment advised at the consultation and, moreover, certain families of moderate means seeing the advantage of the services at the consultations, seek similar services from their own doctors and are willing to pay for them.

The point stressed in this paper is not the necessity for any particular form of clinic or health center, although in many instances the prenatal and child health consultations have met the most outstanding needs. It is rather that, having ascertained the reasons for the unnecessary deaths of mothers and infants, each community through the leadership of informed groups of citizens should see to it that the assistance required to combat these mortalities is provided.

COMMUNITY PHYSICIANS

In some parts of the country where

families are widely separated, the employment of community physicians, who, in addition to their private practice, are expected to give preventive and curative treatment to those of limited resources, may be the best method of meeting the situation. In other communities a system of health insurance covering the care of the mother and infant may be an effective means of securing medical supervision.

In any case, measures which have proved successful in reducing infant deaths are well known and are not beyond the resources of any community. It does require vision and interest on the part of those who lead in community affairs. A local health officer with qualities of leadership can greatly further his cause if he takes time to develop this kind of support.

There is no adequate reason anywhere in this nation for losing more than 2 women in every 1,000 deliveries, or more than 50 infants under 1 year, in 1,000 live births. A larger loss of mothers and infants is preventable and discreditable. It means that the given community does not sufficiently care. An aroused public sentiment could make it difficult for any woman to approach child bearing without previous medical supervision, provided that this service is made available by the community as her right if she cannot furnish it for herself.

A CHILDREN'S CODE

There has recently come to the writer's attention a children's code promulgated on April 6, 1934, in that progressive sister republic in South America, Uruguay.¹² This code seeks to correlate the various regulations intended to protect the life and welfare of the child from the prenatal period through adolescence. The enforcement of the code is under the direction of a control council and of provincial and local committees. The council shall

establish the general principles which shall govern the protection of children. These regulations shall be followed by various coöperating committees. The code includes in its provisions the protection of the expectant mother and the new-born infant.

Prenatal protection comprises eugenics, prenuptial examination, care of the pregnant women, including the lying-in and postnatal periods, and the teaching of prenatal care.

Infant protection comprises child health centers, infants' homes, methods of reducing infant morbidity and mortality, mothers' pensions, and the prevention of abuse of children.

The general regulations determined upon by the central council are to be carried out throughout the country by local committees composed of lay and medical members. One may well ask, if in Uruguay, why not in the United States of North America!

SUMMARY AND CONCLUSION

It is the object of the paper to point out that the maternal and infant mortality rates are unduly and unnecessarily high in many rural communities in this country.

These deaths can be decreased when leading citizens are informed and organize to promote corrective measures such as environmental sanitation or the provision of medical and nursing supervision for the indigent as may be needed in their own neighborhoods. In these activities such a committee should be guided by the best professional advice available.

A local health officer can greatly increase the efficiency of his program of maternity and child hygiene if he is able to arouse the active and organized support of those citizens accustomed to lead a community enterprise.

REFERENCES

1. *Mortality Statistics, 1929. Thirtieth Annual Report, Bureau of the Census, p. 38.*

2. *Ibid.*, p. 40.
3. *Ibid.*, p. 36.
4. *Maternal Mortality in Fifteen States*. Children's Bureau, U. S. Department of Labor, Publication 223, 1934, p. 20.
5. *Am. J. Obst. & Gynec.*, 21:143, 1931.
6. *Births, Stillbirths, and Infant Mortality Statistics for Birth Registration Area in U. S., 1930*. Bureau of Census, 1934, p. 3.
7. *Ibid.*, pp. 8 and 9.
8. *Ibid.*, p. 32.
9. *South. M. J.*, 27:430, 1934.
10. *West Virginia M. J.*, 29:365, 1933, 30:289, 1934, and unpublished studies.
11. *Bull.*, Maryland State Dept. of Health, Proceedings Annual Conference of Health Officers and Boards of Health, 1931, p. 39.
12. *Bol. d. Inst. Internacional Americano de Praxecian a la Infancia*. Tomo VIII, No. 1, 1934. 8:102-4. Abstr. in English.

New York Academy Passes on Vitamin "D" Milk

AT the request of the New York City Department of Health, the New York Academy of Medicine, through its Committee on Public Health Relations, made a study relative to the desirability of making energized milk generally available in New York.

A sub-committee consisting of:

Herbert B. Wilcox, *Chairman*
 Paul Brooks
 J. M. Lewis
 Edgar Mayer
 Earle B. Phelps
 E. H. L. Corwin, *Secretary*

prepared the report which was adopted by the Committee on Public Health Relations. This report discusses the reasons for Vitamin D milk, the three methods of producing it (Zucker process, feeding of cows with irradiated commercial yeast or ergosterol and direct irradiation of the milk itself), and the physical, biological, and clinical tests involved and the administrative problem.

The committee is of the following opinions:

1. Since the Zucker cod liver oil concentrate is practically a sterile product when it leaves the manufacturer, the amount added to the milk is small and the procedure involved in

adding the concentrate to the milk by the distributor is one not requiring contact with human hands, the hazard of contaminating the milk is so slight as to be negligible, providing the milk is pasteurized after the addition of the concentrate.

2. From the standpoint of medicine and health, there is no valid objection to permitting the addition of Vitamin D to milk by any one of the recognized methods under properly controlled conditions.

3. Vitamin D milk, produced by any one of the three methods, should be allowed to be sold, provided the containers carry a label to the effect that it is Vitamin D milk and indicating the process used.

4. For the present at least it is desirable that the label merely states the source of Vitamin D, the health department to decide what it considers a normal protective dose and in its license provisions demand proof from time to time that the milk produced under the license contains the stated dosage.

5. Since the production of Vitamin D is still experimental, the basis for establishing minimum standards for Vitamin D content are unsettled and laboratory service for the purpose of making assays is limited, the official health agencies in the State and City of New York would be acting wisely if they deferred, for the present, the enactment of detailed and specific requirements beyond those necessary to assure a product of safe sanitary quality.—Committee on Public Health Relations Report on Vitamin D Milk. *Bulletin of The New York Academy of Medicine*, August, 1934.

The Ninth Pan-American Sanitary Conference

KENDALL EMERSON, M.D.

Executive Secretary, American Public Health Association, New York, N. Y.

THE Ninth Pan-American Sanitary Conference was held in Buenos Aires from November 12 to 22, 1934. It had the distinction of being the first Conference at which delegates were present from all of the twenty-one Republics of America. Among the important topics discussed were suggestions for revision of the Pan-American Sanitary Code, which has been signed by all but one of the Republics and which deals with the international reporting of certain epidemic diseases and quarantine regulations for air and water navigation; and adoption or approval of the International Sanitary Convention for Aerial Navigation, proposed at Paris on April 12, 1933, and already adopted by a number of European governments.

After considerable debate it was finally agreed that the Pan-American Sanitary Code should not at this time be subjected to formal amendment, but that certain interpretive clauses should be formulated by the present Conference and recommended to the several governments as the sense in which the articles of the Code to which they refer should be applied in actual practice, specifically in cases where reservations or difficulties in the working Code provisions had been encountered. These interpretations concerned themselves with: conditions under which notification of the existence of epidemic diseases should be mandatory; approval of

the use by airships of the entry of sanitary information in the log book in lieu of a bill of health; a certain liberalizing of the deratization regulations in vessels built according to approved international rat-proof specifications, or supplied with adequate certificates of deratization.

The International Sanitary Convention for Aerial Navigation was read by the Delegates and its provisions were considered with much care. The Conference voted its agreement with the fundamental doctrines of the Convention and the delegates will recommend to their respective governments adherence to its regulations and its formal ratification.

To expedite consideration of the thirty-two articles on the agenda of the Conference, six Committees were appointed as follows: Committee on Resolutions; Committee on the Pan-American Sanitary Code and the International Sanitary Convention on Aerial Navigation; Committee on Tropical Diseases; Committee on Yellow Fever; Committee on Venereal Diseases; and a Committee on Plague. These committees met and after much discussion formulated certain resolutions regarding the topics assigned for their consideration. These resolutions were subsequently laid before the plenary sessions of the Conference and most of them were adopted with or without modification. They are embodied in the

"Acta Final" of the Conference and will serve as a valuable guide in future Pan-American Sanitary relationships.

The work of the Conference embraced a wide field of public health interest. Its deliberations may be divided into two broad categories: international problems involving the spread of epidemic disease from country to country through commerce and intercommunication; internal questions of public health administration such as municipal and rural sanitation, centralized or provincial authority, hospital and dispensary provision, protection of the milk supply, nutrition, maternal and infant welfare, preschool and school hygiene, tuberculosis, venereal disease and popular health education. At first thought discussion at an international gathering of health problems largely local in character might seem out of place. But just as in any community the standard of health is no higher than the average health of the families of which it is composed, so in the Pan-American family of nations health standards can only be truly gauged by those prevailing in each of the countries included. The Sanitary Conference provides an admirable channel for comparison, through formal report and through personal contact, of the various methods employed in the different countries and their indices of efficiency in the hands of the several administrative officers. It must be remembered that with the vast distances involved such comparisons can be of infrequent occurrence when contrasted with the easy communication possible between State Health Departments in North America.

A full report of the proceedings of the Conference will be issued shortly by the Pan-American Sanitary Bureau in Washington. Reference will be made here to but a few of the subjects discussed. In the administration of public health there is a very clear recognition of the evils involved in the effect

upon it of abrupt political changes. Certain of the Latin American countries are more fortunate than we in our State Health Departments since they appear to have a secretariat of health which carries on despite changes at the top, political preferment perhaps not penetrating as deeply as with us.

There is recognition of the value of the public health nurse and also of the social worker. As yet, however, very little provision is made for such activities in most of our neighboring countries to the south. It would be difficult to meet the expense of maintaining these services from public funds and at the present time adequate training schools for nurses exist to a very limited extent. A similar difficulty confronts most of the countries in the matter of expert public health personnel, there being limited opportunity offered for the technical training of public health executives.

Plague continues to be a major problem of international sanitation. Its existence as an epizootic among inland rodents of certain countries, including the United States, is a probable source of re-infection of port rats adding to the difficulty of keeping ports clean. Both Ecuador and Peru were congratulated on the success with which they were handling their plague problems. It is gratifying to record that the campaign in these two countries is under the direction of an able representative of the Pan-American Sanitary Bureau delegated for this work by the United States Public Health Service. A very efficient system of rat poisoning through the use of food packets containing arsenic has been installed and careful laboratory examinations as well as the reduction of human cases demonstrate the happy results thereby attained.

An interesting discussion arose as to the possibility of the introduction of plague bacilli to American ports through infected fleas in jute bags brought from

Oriental districts. The international Public Health Office of Paris does not feel that the case is proved, while outbreaks of plague in certain places in Peru following the unloading of jute bags containing living fleas on arrival were offered as supporting evidence. So far no plague infected fleas have been found in these bags, but it has been shown by other observers that unfed infected fleas may retain for several months the power to transmit the disease.

The Conference recommended to all the countries represented unremitting efforts toward the extermination of all plague foci and all plague carriers to the end that this grave menace to the public health might ultimately be completely eliminated as a factor in international commerce and communication.

The session on yellow fever was of special interest, evidence in the form of reports of positive serum reactions (mouse-protection test) indicating that the disease exists today in the interior of several South American countries, in one of which it is rather widely disseminated. The same is true to an even greater extent of the countries of tropical Africa.

The fact was also brought out that deaths from yellow fever occurred in regions where no *Stegomyia* mosquitoes or larvae could be found, leading to the belief that some other carrier might be responsible.

Delegates from all the countries reported that malaria continues to be among the most costly of endemic diseases and one that is most difficult to combat. It was recommended to continue the investigations going on at several places or even to create new centers for study of this serious public health problem. It was further recommended that the results of such studies be forwarded to all the countries in the Pan-American Sanitary Conference either directly or through the Sanitary Bureau

and that the various species of anophelines which carry the disease be studied and special methods recommended for the eradication of each. Further studies are also needed in the use of quinine and other drugs as prophylaxes against the development of the plasmodia.

It was recognized that at the present time there is a persistent epidemic of typhus exanthematica in Chile and that country was encouraged to make every effort to bring it under control. At the same time a vote of applause was given the Chilean Health Authorities for their success in preventing the spread of the disease to other countries.

There was considerable discussion of the different strains of typhus fever virus, especially of flea-borne and louse-borne types, with the possibility of these types being reciprocally "revertible." It was agreed that it was not necessary to report flea-borne (endemic) typhus to the Pan-American Sanitary Bureau by telegraph or cable, but that the "epidemic" form of the disease should be so reported.

The increase of undulant fever was noted in reports from several countries and a long resolution was adopted recommending the intensive study, bacteriologically and epidemiologically, of this disease. There are a number of questions still requiring much investigation, such as the relationship of the disease in man and animals, its intercommunicability and the methods whereby this may take place, as for example, through milk and milk products, the value of vaccination and the danger of using living germs for this purpose, the disease considered as a problem in industrial hygiene, and other phases of this complicated and increasing menace to public health.

The discussion of smallpox as an international health problem was gratifyingly brief, indicating that control of this disease is on a relatively satisfactory

level. Brazil presented a report advocating the use of the single vaccination as giving as effective results as the more common practice of revaccination, at intervals or during epidemics, of those already successfully inoculated. The suggestion was referred to the various countries participating for further study, the Conference not expressing an opinion on the report.

Tuberculosis is recognized as one of the major problems in all the countries represented. While the death rates from this disease did not appear to be alarmingly high in certain countries, skepticism was freely expressed by the delegates as to the accuracy of mortality records. In the Argentine itself there are about five deaths annually for each hospital bed available and sanatorium construction is recognized as the first need in better organization of the anti-tuberculosis campaign. Voluntary tuberculosis associations exist but command relatively little public support.

BCG was discussed at length and it was found that its use was prevalent in a number of the South American countries. The delegation from the United States set forth the conservative attitude which had been adopted in North America pending the outcome of more carefully controlled experiments both as to its harmlessness and its effectiveness as a preventive medical measure. The Conference voted that, in spite of the encouraging results which American experience seemed to have indicated, it appeared wise to reserve a final expression of opinion regarding the general use of the procedure and to recommend its employment only in those cases where vaccination with BCG appeared to offer the only, or at least the most probable, method of protection for an individual infant.

Venereal disease is considered one of the major menaces to public health and all of the delegates expressed the

opinion that greatly added facilities were urgently needed to combat this danger. Educational means were advocated and the provision of more adequate dispensary service together with increase of the free distribution of neosalvarsan.

A resolution of gratitude to the Rockefeller Foundation was passed for its work in the eradication of ankylostomiasis and all countries were urged to continue unremittingly their attack on this disabling disease.

It was recognized by the Conference that while the sanitation of cities, especially those ports involved in international commerce, had progressed to a striking degree during the past thirty years, rural sanitation had by no means kept pace with this progress in most of the countries participating. A resolution was passed stressing the importance of more attention to this very essential phase of public health work and encouraging all the countries to increase their facilities for its expansion.

Maternal and infant welfare projects were reported from several countries and the children's code originated and practised by Uruguay was recommended for favorable consideration by the delegates. Preschool and school hygiene were admitted to be still in an embryonic state and their importance to the public health was clearly pointed out. It was resolved to further the interchange of experiences in these branches of preventive medicine, with especial reference to the desirability of periodic health examinations, the correction of remediable defects and the keeping of adequate records of the health of school children.

Nutrition, safeguarding food supplies, the international traffic in drugs and alcohol, and especially the necessity for greatly increased popular health education were among the many other topics discussed.

As has been mentioned, the outstanding feature of the Ninth Pan-American Sanitary Conference was the fact that all the Republics of the two continents were represented by officially appointed delegates. In addition, the reports of public health progress made in the several countries were most carefully prepared and will be most valuable in documenting present practice in preventive medicine. Discussion was abundant, radical disagreements rare, and

there was a gratifying accord on questions of fundamental significance to the underlying principles of public health. A number of topics were left open for further discussion and referred to the next Pan-American Conference for its consideration. Aside from its scientific value, the meeting was notable for the fine spirit of friendliness which prevailed and as an effective opportunity for the promotion of international amity and understanding.

Negro Housing Projects

COL. H. B. Hackett, Director of the PWA Housing Division, lists the following Negro housing projects as now under consideration in his department:

Atlanta, Georgia: University Housing Project, to rehouse 617 families in 2-story row houses and 3-story apartments. Project will contain 2,457 rooms, be built on fraction of 800,000 sq. ft. of land, cost (estimate) \$1,900,000.

Indianapolis, Indiana: Indianapolis Community Housing, 1,044 dwelling units containing 3,190 rooms in 2-story

row houses and 3-story apartments. To be built on 940,000 sq. ft. area, to cost (estimate) \$3,000,000.

Montgomery, Alabama: Thurman Street Project, to rehouse 161 families in 1- and 2-story row houses, each with separate yard and porch. Land area to be used, 300,000 sq. ft., cost to be (estimate) \$315,000.

Similar projects are under consideration in Detroit, Cleveland, and Washington, for which complete information is not yet available. Rentals have yet to be determined for each project.—*Public Housing Progress*, Nov. 15, 1934.

EDITORIAL SECTION

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LOOKING AHEAD IN PUBLIC HEALTH

AT this time of year many health officers have already planned their budgets and activities for the ensuing year based entirely upon consideration of local problems and resources. Little consideration by health workers has, however, been given to any national program to improve or extend the public health facilities generally of local, state, and federal health agencies. The effects of the depression upon health work which have been frequently reviewed through the columns of the *Journal*, have been, in essence, to reduce personnel and budgets for state and local health services about 20 per cent on the average. The federal support of activities which aided state and local areas has been reduced an even greater amount. To counteract this in part, a number of emergency relief projects have been provided in the public health field dealing largely with environmental sanitation. More recently an allocation of \$1,000,000 from relief funds to the U. S. Public Health Service for aid to state and local health departments has served to relieve the local situation somewhat. But something more than these sporadic and temporary measures is needed to provide effective, well planned and conscientiously executed full-time health supervision.

For a number of years the Association, through the *Journal* and otherwise, has urged broad gauge consideration of public health by the federal government and the development of plans whereby federal influence and resources could be effectively utilized to stimulate further support and aid of local and state health departments.

The President has recently appointed a Committee on Economic Security. Obviously, public health service along the lines now generally accepted and known to be effective, if extended to reach a large majority of the population, would make a real contribution toward economic security, through minimizing the tremendous annual loss from preventable diseases which now amounts to hundreds of millions of dollars.

The President's interest in public health is well known. That he has a sound conception of the fundamental responsibility of government for the organization and support of health services is evident from the report of the New York State Health Commission which he appointed and sponsored.

We believe that this is a most opportune time for health workers to make known their problems and to state clearly the need for federal leadership in health matters and the degree to which the population suffers both economic loss and physical impairment because of diseases demonstrated to be preventable.

Through these columns we have repeatedly urged members to acquaint their representatives in Congress with the importance of public health, and the necessity of federal action in support of health work. We again suggest that you use every means at your disposal to interest your representatives in Congress in the passage of constructive measures and provision for more adequate support for federal health agencies.

More than this, we suggest you write to Miss Frances Perkins as Chairman of the Cabinet Committee on Economic Security, or to Mr. Henry Morgenthau, Jr., as Secretary of the Treasury, or to President Roosevelt, telling of your local health needs which are as yet unmet or which have been curtailed through budgetary cuts, and pointing out the desirability of federal aid and leadership and the need of increased appropriations for the conduct of health services of the federal government, particularly of those of the U. S. Public Health Service and the Children's Bureau to permit them to function effectively in their appointed fields.

You, as health workers, should voice public opinion in health matters and cannot expect your government to provide service for which there is no expressed demand. It follows therefore that unless you are willing, personally and through locally important people, to use every effort to influence federal activities at this time, you must not be dissatisfied with the crumbs of consideration which the work has received in the last few years.

MORE TRUTH IN VITAL STATISTICS

THE great development of hospital facilities in cities during recent years has brought with it a misleading inflation of birth and death rates in certain urban areas, and fallacious reduction of the corresponding rural rates. On the other hand, sanatoria have tended to transfer deaths from cities to rural areas.

As an extreme example of the serious distortion which may be produced by the factor of nonresidence: in New York State, the 1931 birth rate for the upstate urban area, as ordinarily recorded, was 18.1 per 1,000 population, which is 50 per cent higher than the recorded rate for the rural areas. But when correction is made for nonresidence, the urban and rural rates are found to be identical, *viz.*, 16.1.* Again, the uncorrected death rate was slightly higher for urban than for rural areas; but after residence correction this relation was reversed: 11.6 for urban, as against 13.4 for rural. More extreme distortions may be cited in the death rates of such hospital centers as Rochester, Minn., and Ann Arbor, Mich. The effect of such bias has been to make some tables a little worse than useless.

* Report of Committee on Residence Correction, Vital Statistics Section, A.P.H.A., presented at the Pasadena meeting, September 3, 1934. To be published in the 1934-5 Year Book.

There have been sporadic attempts to correct this situation by the publication of residence corrected tables in federal and in certain state reports, but too often the correction has been incomplete, or has applied only to a few tables, such as deaths from all causes, or from a few selected causes.

In the light of the growing importance of this problem it is highly gratifying to be able to report two important recent developments. One is that the Division of Vital Statistics of the U. S. Bureau of the Census has expressed the intention of publishing its birth and death statistics on a residence corrected basis beginning with the 1935 volume.

The second development is that the 1932 *Vital Statistics Report* of the New York State Health Department carries, for the first time, a relatively complete set of tables for all administrative divisions of the state, corrected by intra-state transfer of nonresident births and deaths. Earlier reports had published special tables with residence correction, but this, so far as is known, is the first American report in which one can seek information concerning practically any intra-state vital statistics of importance, with the assurance that the data are not seriously biased by the residence factor. The Department of Health of New York State and the Director of its Vital Statistics Division are to be congratulated upon this notable contribution.

CHARLES PORTER, HONORARY MEMBER, SOCIETY OF MEDICAL OFFICERS OF HEALTH

AT the Annual General Meeting of the Society of Medical Officers of Health of England, Dr. Charles Porter, Honorary Member of our Association, the Editor of *Public Health*, and the author of the letter to our *Journal* from England, retired as President.

A unanimous vote of thanks to the retiring President was passed, and Professor W. W. Jameson said that "of all the Presidents of recent years, not one of them deserved the office of President of the Society more than Dr. Porter, who, in all the years of his connection with it, had thrown himself heart and soul into the work and organization of the Society. During his year of office he had done a great deal to enhance the prestige of the Society; he had attended all the meetings and gatherings," and had spoken in behalf of the Society on many occasions. While regretting the loss of his services as President, it was realized that he would now be at liberty again to devote his energies more fully to his duties as Editor of *Public Health*.

Dr. Porter is succeeded by Dr. R. Veitch Clark, Medical Officer of Health of Manchester. He has given distinguished service and has had the exceptional honor of occupying the Presidential chair of two Branches of the Society, the Home Counties and the North-Western. At his installation, he gave a most thoughtful and stimulating address on "Imagination in Public Health."

CHARLES V. CHAPIN, HONORARY FELLOW, SOCIETY OF MEDICAL OFFICERS OF HEALTH

ONE very pleasing event of the afternoon was the election, to the Honorary Fellowship of the Society, of Dr. Charles V. Chapin, formerly Superintendent of Health and Registrar of the City of Providence, R. I., a position he

had occupied continuously from 1884 till 1932. Though those who moved and supported the enrollment of Dr. Chapin had words to say in support of the proposal, and references to make to the services rendered by him to public health and preventive medicine not exclusively in his own area but throughout the United States and the world at large, actually there was no need for commendatory words. The name of Chapin is known to every Fellow of the Society and to everyone engaged in the health service of this country. He is and always has been regarded as a leader in sanitary science and preventive medicine, and his pronouncements have always been received with respect, and generally regarded as indications as to the line that might safely be taken at once and that inevitably would be taken eventually. It has always been a matter of real pleasure and for congratulation that Chapin was and had been during his working years an ordinary Fellow of the Society. The opportunity of transferring a colleague from the list of ordinary Fellows to the roll of Honorary Fellows presents itself so rarely that the feeling of gratification naturally experienced was very greatly enhanced in the case of Dr. Chapin. Indeed, the only possible reason for regret was that so long a period had been allowed to elapse before the elevation had taken place. There was this also, that to a certain extent in entering the name of Dr. Chapin a link in the chain binding the United States and ourselves, missing since the death of Dr. Welch, had been replaced."—*Public Health*, Nov., 1934, pages 64-65.

SOUTHERN BRANCH OF THE A.P.H.A.

THE third annual meeting of the Southern Branch was held at San Antonio, Tex., November 13 and 14, conjointly with the Southern Medical Association. The meetings were presided over by Dr. Arthur T. McCormack, Health Officer of Kentucky.

There were some 250 registrations, and a number of visitors from outside of the southern section, many of whom took part in the discussions. At the same time the American Society of Tropical Medicine and the National Malaria Committee met, and some joint sessions were arranged which were full of scientific interest, and especially applicable to those living in the southern part of our country and the countries south of us.

The Southern Branch had a full program which made attendance well worth while even if there had been no conjoint meetings or other papers of much interest in the several societies meeting.

Among the distinguished visitors was Dr. Miguel E. Bustamante, Chief, Bureau of Federal Health in the Mexican States. A letter was received from Dr. Manuel F. Madrazo, Chief of the Department of Public Health, and was read by the President. It contained an invitation to our members to take part in the Post-Convention trip to the City of Mexico. Unfortunately only a limited number could do so.

It may be noted with satisfaction and pleasure that at every meeting of our Association for some years past our sister Republic to the south, which is a constituent member of our Association, has been represented, and we trust that each year will bring an increasing number of the health officers of that country to meet with us. Dr. Bustamante introduced two health officers from Mexico who were with us, Dr. Manuel B. Marguez Escobedo, Guanajuato; and Dr. Telesforo Chopa, Monterrey.

Altogether, the meeting was most enjoyable and most successful.

MEDICAL AND SCIENTIFIC ENGLISH

AS long as the medical profession contains men capable of producing such articles as that given by Dr. Hurter as his inaugural address¹ before the 95th Session of the Liverpool Medical Institution, it will be to a large degree safe from some of the charges leveled against it, chiefly by editors, and often with good reason. Even those who consider themselves scholars will doubtless be surprised at the wealth of material given in this short address. In commenting upon it, the *Journal of the American Medical Association* quotes the opinion, ascribed to experts, that there are scarcely 100 competent medical writers in our country today, while others believe that the number is no greater than 10 or 12. Certainly every editor will agree to a greater or less extent with these opinions. Writers do not seem to recognize that careful editors are apt to be prejudiced for or against the contents of an article somewhat by the way in which the writer expresses himself. Perhaps this is in a measure unjust. There are rough diamonds who have not yet learned to use language but, as a rule, we cannot but agree with the statement of Buffon that a man's style is the man himself. Carelessness in expression certainly indicates some lack of an orderly mind and leads one to suspect the value of alleged scientific facts expressed in loose language.

We believe that Dr. Hurter uses the word jargon in its older sense, though he clearly recognizes its descent into slang. In its older senses, it means "the dialect of a special sect or fraternity." "Applied contemptuously to the language of scholars, the terminology of a science or art, etc." (1651). Dr. Hurter recognizes vocabulary jargon and composition or prose jargon. Of the latter he gives an example taken from a lecture by Sir Arthur Quiller Couch, at Cambridge, some 20 years ago, which is classic:

A.D. 1604

To be, or not to be;
that is the question
Whether 'tis nobler
in the mind to suffer
The slings and arrows
of outrageous fortune,
Or to take arms
against a sea of troubles,
And by opposing
end them? To die: to sleep;
No more; and by a sleep
to say we end
The heart-ache, and the
thousand natural shocks
That flesh is heir to,
'tis a Consummation
Devoutly to be wished.

A.D. 1913

To be, or the contrary? Whether the former or the latter be preferable would seem to admit of some difference of opinion; the answer in the present case being of an affirmative or a negative character according as to whether one elects on the one hand to mentally suffer the disfavour of fortune, albeit in an extreme degree, or on the other to boldly envisage adverse conditions in the prospect of eventually bringing them to a conclusion: The condition of sleep is similar to, if not indistinguishable from, that of death; and with the addition of finality the former might be considered identical with the latter; so that in this connection it might be argued with regard to sleep that, could the condition be effected, a termination would be put to the endurance of a multiplicity of inconveniences, not to mention a number of downright evils incidental to our fallen humanity, and thus a consummation achieved of a most gratifying nature.

Dr. Hurter points out the difference in length between Shakespeare's lines and the transcription into jargon, the former having 72 words against 161 for the latter. He holds that circumlocution, as shown in the transcription, is a main feature and one of the vices of Jargon. Shakespeare used concrete words to symbolize abstract ideas by images, whereas Jargon fails completely because "it discards the concrete and relies almost entirely on vague abstract expressions."

Jargon feeds on the pompous display of sonorous polysyllables and vague "wooly" abstract nouns which "are its very life blood."

The lesson for doctors pointed out is that they should write in the active voice and use transitive verbs, for example: "The nurse gave him morphine hypodermically," instead of "He was subjected by the nurse to the administration of a hypodermic injection of morphine." How few editors have escaped torment from the misuse of the words "case" and "instance"! Sir Arthur Quiller Couch said, "The man who writes 'Instances of premature mortality are more frequent in the case of men than in the case of women,' when he means that more men die young than women, sins against the light." In a recent paper the writer found, "These cases contracted their infection at . . ."

Sir James Barrie is quoted as saying "The Man of Science appears to be the only man who has something to say, just now—and the only man who does not know how to say it." It is not clear that doctors were included in this criticism, though there is no doubt that the "taunt is not altogether undeserved by many scientists and doctors even to-day."

An example of the practical value of style comes to mind. One of the most famous physicians of America, noted for his originality and the operations he devised and carried out successfully, wrote what has been called "the first thoroughly comprehensive book on the subject in America." It was well received, but had no extraordinary circulation. About the same time another noted physician wrote on the same subject. The latter was a successful practitioner, not at all original, and we know of no operation that bears his name. He was, however, a master of English and style. His book was translated into French, German, Italian, Spanish, and Chinese, and 60,000 copies were sold.

We have always deplored the cutting of fundamentals from the required studies in colleges and universities. Greek and Latin, for example, may have little direct bearing on surgery or internal medicine, but their study gives an appreciation of culture and assists in the use of language. In the hurry of American life, have we not taken too many short-cuts? English medical writers show a broader culture than American as a rule, and we believe this is due to better fundamental education, and a comparative freedom from the desire to master the practical and money-making arts.

REFERENCE

1. Language, Jargon, and Modern Medicine. *Liverpool Medico-Chirurgical Journal*, 42:1 (part 1), 1934.

PUBLIC HEALTH EDUCATION*

PUBLIC HEALTH INSTRUCTION

IT must bring to the people only what is established on a sound scientific basis. It must present its facts with the most effective technic, as to selection of content and form, so as to make the essential facts clear and to arouse an effective desire to apply them. And, finally, the program must be so planned as to emphasize those things which are vitally important and to do so at the times and under the conditions where application of the principles in question can most easily and effectively be made.

C.-E. A. WINSLOW

"The Crying Need of the State"—A "Health Survey of the State of New Mexico," sponsored by the New Mexico Tuberculosis Assn., and published by the state, is edited by Carl E. Buck.

Among the recommendations for the State Bureau of Public Health it is good to note the following:

A reasonable appropriation for public health education. At the present time there is no special appropriation for this work and yet public health education is the crying need of the State of New Mexico.

Then there is this:

Two additional persons, one a stenographer at \$1,400 per year and the other an assistant in health education at \$1,500 per year. (\$2,900.)

Proposed also are 3 supervising nurses at \$2,400; 11 county nurses at \$1,800; and 28 sanitary inspectors at \$1,500.

We wish that the report had given some indication of the duties of "an assistant in health education." Lacking that information we are glad that

the health educator rates no lower than the trained sanitary inspector and that as "an additional person" he will have a \$2 a week edge over the stenographer who doubtless will be a commercial college graduate.

Extremes in the Movie Industry—From June, 1933, to June, 1934, some 500,000 people in 60 cities of 15 states saw "Damaged Lives" and the film lecture on syphilis, "Science and Modern Medicine," and 90,000 carefully prepared pamphlets were sold to those who saw the films.

But the irresponsibility of local exhibitors made it necessary to withdraw the A.S.H.A. endorsement of the picture. Some of the local advertising was of a sensational or salacious nature. In at least one city the picture was accompanied by a lecture of objectionable character, and unauthorized pamphlets were sold at a high rate.

The other extreme was the censorship which closed to the picture some 37 per cent of the potential audience, including the states of New York, Pennsylvania, and Ohio.

If the picture is shown anywhere under the supposed auspices of the

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

American Social Hygiene Association you will help by quickly notifying the association at 50 West 50th St., New York, N. Y.

"Doctors, Dollars and Disease"—This is the title of a series of radio programs on medical economics which will run through Feb. 25, 1935 (with 3 exceptions), on Mondays at 10:30 P.M., E.S.T., over WABC, Columbia network, 60 stations. For a full list of topics write to National Advisory Council on Radio in Education, 60 E. 42d St., New York.

The Advisory Council says:

This series of broadcasts will consider the subject of medical economics, the cost of medical care, the relation between the medical profession and the public, the ways of reconciling the interests of the two groups.

The recent progress of the science of medicine has been little short of miraculous. Physicians as a rule have shown fine professional spirit and have given freely of their time without pay. Yet more than 50 million persons in the United States either do not receive the care which they need, or are heavily burdened by its costs, while many practitioners and agencies for health are under-employed and poorly paid. The barrier is mainly economic. It stands between the doctors and the dentists and the nurses who are able and eager to serve and the patients who are sorely in need of the service. The problem is to bring doctors and dollars and diseases into such helpful and continuous contact with each other that the *practice* of medicine can keep pace with the *science* of medicine. That is the central theme of this series.

The series was arranged by a Public Health Committee of the Advisory Council, with a chairman who is an economist, and five members who are in public health or have been associated with public health interests.

What Education Has Been Done—Brief extracts from annual reports tell us what has been done and sometimes illustrate the meagerness of our tangible, reportable efforts. We hope

to quote from various reports from time to time.

The New Haven (Conn.) Foundation reports:

Educational publicity on the early signs and symptoms of the diseases was carried on in the same manner as in the preceding year. A total of 22,900 pamphlets were distributed in the city and certain sections of the Metropolitan Area. This distribution was supplemented by local newspaper articles and talks to lay and professional organizations. Hospital records for the year 1933 indicated a continued steady decrease in the median period of delay between primary symptoms and hospitalization. It is conceivable that the committee's educational policies may be partly responsible for this. That the median decline from 7.8 to 5.6 months in a period of 4 years has been less rapid than might be expected may be due to the fact that about 47 per cent of all cancer cases hospitalized during this period have been non-residents—many coming from areas outside of the committee's sphere of educational influence.

What Radio Objected To—In November the Columbia Broadcasting System refused to allow syphilis to be mentioned by Dr. Thomas Parran, Jr., who was to have spoken in the "Doctors, Dollars and Disease" series.

The censor objected to these two paragraphs:

Against cancer, no progress has been made. Yet many cancer victims could be completely cured if only the disease were recognized in its early stages. We have made no progress against syphilis, though its end results crowd our jails, our poorhouses, and our insane asylums. Yet there are specific methods of controlling it better known to science than the methods of controlling tuberculosis. We need only to do what we know how to do, in order to wipe out syphilis as a public health problem.

In my philosophy, the greatest need for action is where the greatest saving of life can be made. I consider, then, that our greatest needs in public health are first, the leveling up of present services so that every community may receive the benefits that have long accrued to the leaders; and second, a frontal attack by all communities against maternal mortality and deaths among newborn infants; against dental and faulty nutrition; against tuberculosis, where splendid

gains have been made; against cancer and syphilis, where we have done little or nothing.

The leading newspapers of New York City mentioned the incident, explaining that syphilis was the objectionable word.

Baltimore, Connecticut, and Illinois—In Baltimore, as a rule, broadcasts are sponsored jointly by the City Health Department and the Medical and Chirurgical Faculty of Maryland. The following topics were presented in October and November:

Diphtheria Prevention . . . The Department of Education and the Diphtheria Prevention Campaign . . . Parent-Teacher Associations Believe in Diphtheria Prevention . . . Catholic Schools and the Diphtheria Prevention Campaign . . . What You Should know About Hearing . . . Autumn Chills and Colds . . . Has Your Child Been Protected? . . . The School Lunch . . . Why Fumigation Has Been Abandoned . . . Sensible Safeguards in Communicable Disease Control . . . Carbon Monoxide—The Unseen Foe of Man.

Various staff members of Connecticut Department of Health shared in the broadcasting of the following topics:

Safe Bathing . . . How Did You Sleep Last Night? . . . Is There Protection? Against Venereal Diseases? . . . Adolescence—A Period of Development . . . The Physician and the Public Health Nurse . . . The Laboratory's Part in Disease Outbreaks.

For many months now all broadcasts of Illinois Department of Public Health have been prepared by Dr. C. M. Chamberlain, of Division of Communicable Diseases. Recent topics have been as follows:

New Hope for Narcotic Addicts . . . The Newer Treatment for Serious Burns . . . Putting Poison in the Pantry . . . The Evil of Extracurricular Activities for the School Child . . . New Light on Inheritance . . . The Great American Tragedy (unsafe driving) . . . The Worst of All Diseases (heart disease) . . . Abdominal

Pain and the Operation . . . United States Political History from a Test-Tube . . . Delicious But Deadly Mushrooms . . . The Problem of Skin Disease . . . The Fourth Horseman (wreckless car driver) . . . Battling the Coryza "Bug" . . . Your Germs and Mine . . . How's Your Rheumatism? . . . Death Fighters.

Should the Public Health Education Section Do Likewise?—Much material from advertising sources is used by schools and by health departments. *How may we decide what is sound and desirable for use, and what is unsound or otherwise undesirable?*

An answer to this question has been sought by the food and nutrition division of American Home Economics Association. A report is presented by the chairman of the committee on illustrative material, entitled "Criteria for Evaluation of Illustrative Material for Foods and Nutrition Teaching," by J. I. Rowntree. The report presents questions and sub-questions to be raised as to

Educational value of the commercial and non-commercial materials and to the appraisal of advertising matter.

Many of the questions about the suitability of the material and its educational value might well be asked about much material issued by health agencies, and the manner of using health education material from any source, such as:

Are posters used mainly to fill space on an uninteresting wall, to give the room a semi-scientific appearance, or are they shown only when they will serve a definite purpose in developing judgment or supplementing information?

Is there one fundamental point which attracts attention, and do all other data support, clarify, and explain that point?

Is the material presented in a vivid manner that readily attracts both the eye and the interest?

Does the form aid in organizing the subject matter presented?

Are well-labeled tables or graphs used to impart essential information?

Does the mass of detail and profusion of material result in a confused or fleeting im-

pression rather than the acquiring of one essential idea?

From the third section, "Appraisal of Advertising Matter, we quote two groups of questions:

Is the information set forth scientifically sound?

Were the claims which are made for the product verified in a sufficient number of laboratories to be conclusive?

Is the product likely to have the same value with human beings on ordinary diets as under the laboratory conditions tested; for example, with rats under experimental conditions on very restricted diets?

Do the claims savor of quackery?

Is the advertiser thoroughly ethical in his relation to the public?

Is he attempting to practice medicine without a license?

Is he prescribing for all kinds of human ills without regard to individual needs, encouraging people in self-medication, and thereby delaying proper treatment?

Is he advocating his products for rheumatism, intestinal disorders, heart abnormalities, and infections that merit other attention?

The committee is continuing its work with Mrs. Jessamine Chapman Williams, Oregon State College, Corvallis, as its present chairman. It will welcome criticisms and suggestions for those who attempt to use the present outline.

The report is supplemented by editorials on "School Use of Advertising Material" and "Advertisements of Medicines," the second quoting the text of 6 general rules announced by Federal Trade Commission as its basis for passing upon the advertising of medicines.

All who feel any concern about the use of commercial material by schools and health agencies will wish to read the report and the editorials. In *Journal of Home Economics*, 101 E. 20th St., Baltimore, Md., Dec., 1934. 30 cents.

Some health workers may try out the proposed criteria and report to the chairman.

The Public Health Education Section may look forward to setting up

criteria for the aid of health agencies as well as schools, with due regard to material coming from orthodox health sources as well as that supplied by advertisers.

Soundness of the statements and the relation of the material to advertising is one problem.

The educational value of the material and its suitability to various audiences calls for consideration in connection with the whole range of material more or less lavishly distributed by health agencies. Could we start with minimum standards as to the physical make-up of printed matter? These standards to say that, lacking them, a piece of printed matter looks so dull or uninviting that it is pure waste to distribute it?

"Two Seats on the Aisle"—Questions put in "Second Balcony":

How many (advertisers, store managers and their kind) make a practice of sitting in second balcony seats when they attend the theatre?

How many sit in the bleachers at the ball game?

How many ride cross country in buses?

How many hang onto the trolley straps when they go about their work in the cities?

Do you? Those are the places where your customers are!

There are to be found those "who buy and buy and buy," says the author.

The sales-minded man or woman may not live with the mass (called "mass" for want of a better name) but he should be part of it. He should mingle with it, listen to it, talk to it.

Read the *'Merk* to enliven your inner life. Hear one of Gertrude Stein's lectures—if you can. But, for your business, remember that the publication that has the biggest circulation in this country is Mr. Hearst's *American Weekly*. And millions of copies of *True Story* are still being sold.

In *Advertising and Selling*, 9 East 38th St., New York, N. Y. Nov. 8, 1934. 20 cents.

The quotations may remind health educators of *their* audiences—not our

friends and associates, not members of boards and committees, not the people we know, but those we are not likely to know unless we are very much on the job.

Good to Read but Not to Look At
—Brevity is not always the soul of good writing. Briefly, the Illinois Society for the Prevention of Blindness might have told in its annual report that 240 trachoma clinics were held, 9,894 attended, and 309 operations were performed. As Miss Audrey Hayden, executive secretary of the society, reports these clinics in three single spaced typewritten pages, the people who attended them emerge as human beings. The amusing, if sometimes disheartening adventures make the clinics more than a routine service. There is an account of the borrowing of rooms for clinics including "the only available room in the courthouse which, at the time it was assigned to us, contained two tons of coal, 1 load of wood and 43 spittoons."

Just as humanly, and also with the spirit of adventure lending excitement to success, Miss Hayden tells of the educational work with midwives and of the sightsaving classes.

This is the "report of the executive secretary"—duplicated for a little extra use among those interested in the society. Even so, we wish that there were some headings to make up, partly for the lively reading by Miss Hayden at the Annual Meeting.

Ask the Illinois Society for Prevention of Blindness, 203 N. Wabash Ave., Chicago, to send you a copy of this report which is dated November 19, 1934.

"Situations Frankly Revealed"—Public relations means just that—relations with the public that lead to confidence and understanding, support and

use of the health organization of any type.

"If it is important," says Violet H. Hodgson, "for the public health nursing organization to analyze the needs and discover the desires of the public," then

It is equally essential that the public understand the objectives, policies, and needs of the organization. This necessitates a broad program of publicity that will keep the public in touch with the program the year round and not merely during the annual drive for funds. Good will must be established and maintained through a high quality of service and a general approval of the policies and program of the organization. Such approval can be expected only when the public has been taken into the confidence of the organization, and situations frankly revealed which make changes in content or administration necessary. Frequently this knowledge is confined to the board and professional staff. The public, as sole stockholder and consumer, is entitled to periodic reports sufficiently frequent to keep them informed of the activities of the organization.

Mrs. Hodgson discusses courtesy and friendliness by staff and volunteers in the home and at clinic or conference as important factors in good public relations. In "Public Relations in Public Health Nursing." *Public Health Nursing*, 50 W. 50th St., New York. Nov., 1934. 35 cents.

When the Horse Changes Color—One angle of the not altogether simple problem of personal publicity for the professional man is illustrated in the following, taken from a state medical journal:

A little group of physicians was discussing the abuse of advertising when the question of pictures in the lay press came up, and one man called the attention of the group to a picture in a local paper of a group of State Association officials, and he inquired as to whether that would not be termed advertising. It seemed to be the consensus of opinion that such pictures were news stories and should not be considered as in any wise unethical, and we believe that is a correct interpretation. It becomes a horse of a different color,

however, when one's picture accompanies an article that is a personal boost, for there really is no necessity for using a picture of a physician along with a tale of his personal prowess.

A Health Education Program for 200,000—Savel Zimand, after several years' experience in Bellevue-Yorkville area, New York City, sets down "An Organized Community Health Program" in *Quarterly*, Milbank Memorial Fund, 40 Wall St., New York, N. Y. Oct., 1934. 25 cents.

The objectives of popular health instruction:

First, it is vital that the community have a general knowledge and understanding of the work of the official health organization. Few people now realize in full the important rôle played by a health department in maintaining the welfare of a city, or the various services, with a direct influence on their own and their family's life, it renders. The public should know how a health department functions; its responsibilities; the services it maintains; when and how they may call upon it for help; what constitutes a violation of health ordinances; and to whom such violations should be reported.

The other objectives might be summarized as follows: Familiarizing the community with facts related to health conservation and disease prevention; securing desirable changes in public opinion, attitudes, and habits on questions of preventive medicine and public health*; creating a desire for new facilities; and educating the community to utilize the medical services of a private physician or, if financially unable to pay for such services, to use those of the community's clinics or hospitals.

While the objective should be a well rounded program, local conditions of the area will help determine which subjects should receive the most emphasis. The formulation of a program for a specific district will de-

pend on research, local surveys, and a study of the vital statistics of the area. In any case it seems important, both because of the numbers affected and the opportunity for preventive work offered, that the program include, in addition to acquainting the public with the work of the health department, such subjects as venereal diseases, tuberculosis, maternal and infant care, diphtheria prevention, child hygiene in general, prevention of colds and pneumonia, dental hygiene, nutrition, the dangers of self-medication and quackery, periodic health examinations, and safety at home and in the street.

Then follows an outline of "Methods," "Machinery," and "Instruments," with sections on "Health Education for the Professional Groups" and "School Health Education."

Probably it would be interesting and it might be profitable for health workers in a city or a district of comparable size to sit down with this outline and check the local activities with this demonstration program.

"Wasn't That a Good Speech?"—Under this title appears a "code for convention speakers." The writer outlines what constitutes a good convention speech.

Naturally, the very first injunction must be *Avoid the obvious*. We all constantly suffer under the so-called eloquence of speakers who labor for the thousandth time educational platitudes that begin to impress us as probably not true, because we have grown so tired of them. . . . And even greater misdemeanor, however, is committed by some would-be clever speakers who take these obvious facts and principles and seek to disguise the obviousness of what they are saying by clothing them in a complicated and bewildering terminology. Disagreeing completely with Shakespeare as to what's in a name, they seem to believe sincerely that a new name for an idea makes it a new idea.

In our own energetic day there are so many really new activities going on and so many points of conflict are involved in these, that it ought to be easy to carry out the second suggestion: *Seek and develop a controversial point*. We are much more likely to interest our hearers if we do so. It is desirable to avoid personalities, to keep the battle on a high plane of principles, but it might be even

* As Mary P. Connolly has stated (Connolly, Mary P.: *Organization of Adult Groups for Health Education. American Journal of Public Health*, 24, No. 6, Part 1 (June, 1934, pp. 571-575): "In addition to personal health advice it is important in this day of too close living that men and women shall learn something about disease communication and how they may safeguard themselves; something of the principles of sanitary science, if only for esthetic reasons; something about child care and behavior which will give their children a better chance."

better sometimes to mention someone by name whose ideas we are attacking and to make the conflict somewhat of a personal one than to omit the element of the controversial.

On the other hand, we are professional men and women, and out of a spirit of fairness it is necessary to *Present both sides*. Show the two pictures, and you will not only be displaying the spirit of fair play, but also be making use of the device of contrast, in itself a useful rhetorical method for securing interest.

We have in the past been so sensitive in the matter of dignity that it is more than difficult for some teachers to observe the fourth injunction: *Be lively*. . . . A little slang now and then will do no harm and there is no question that colloquialisms ought to be pretty freely employed. Talk American—1934 American.

It is very important that the next commandment should be observed: *Reach some definite conclusion*, and avoid detours in reaching it. Many a speech goes wobbling along without purpose for dreary minute after minute and when the orator (save the mark!) is through, no one knows what he has been driving at. The closing passages of the talk should make clear, in vigorous phrasing, what it was all about.

This conclusion will be an especially effective one if the speaker observes the next principle: *Say something practical*. (This may mean concrete advice, or the clearing up of a doubt.)

In these days of confusion of the public mind on the subject of the schools and education, it is well to keep in mind this point: *Prepare your talk so that one particular paragraph of it (say 150 or 200 words) can be used for publicity purposes*. Of course, the publicity must be good publicity and educators would do well to educate themselves on this subject, inasmuch as anyone acquainted with the principles and the psychology of sound public interpretation is likely to be all the better educator. This paragraph should not only contain the nub of your remarks but it should be phrased in a way that will entertain as well as instruct—two ideals by no means mutually exclusive.

The next commandment is very brief: *Stop when you're through*.

The next is also brief and also important: *Revise your talk . . . and cut it down one-third*. You will not hurt anyone's feelings by talking more briefly than you are supposed to talk.

Perhaps the last commandment, in accordance with the Biblical saying, ought really to be first: *Learn how to talk*. One need be

no orator, but certainly any address by a teacher ought at least to be clear in enunciation, careful in pronunciation, and pleasing as to voice. Many a good address is made intolerable by wretched delivery.

Journal, Natl. Education Assn., 1201 16th St., N.W., Washington, D. C. Nov., 1934. 25 cents.

Do Safety Campaigns Fail?—A Los Angeles police official points to a recent campaign to reduce traffic accidents during which "the (traffic) death rate rapidly went up until it was 20 per cent above 1933." Then, when the campaign ended, the rate "went back to normal."

Says *Literary Digest*:

Mr. Steckel deserves credit for his candor, and for his effort to get at the facts, no matter how they conflict with cherished beliefs. Nevertheless, he sounds far too pessimistic. Let him call any experienced editorial writer, advertiser, or press-agent into conference, and he quickly will learn where his error probably lies. These men know that the public's opinion and conduct can be influenced, and are being influenced, constantly, but that, in some instances, at least, it takes time. Frequently, there is a noticeable time-lag between the date when one of their campaigns is launched, and the date when it begins to show results. Usually the results appear, sooner or later, but they may appear in the period following the one in which they are expected.

The Volunteer in Publicity—All too little use has been made of volunteers by public health departments, and too little publicity use has been made of them in the year-round work of private associations.

A plan and a program for volunteers in public health nursing groups is presented by Evelyn K. Davis. In essentials, what Miss Davis offers seems widely applicable.

Some of the headings: "A Plan Essential," "Finding the Job," "Recruiting the Volunteers," "Placing the Volunteers," "Training the Volunteers," "Management." The article is one to be studied and kept for reference.

Publicity and health education in its inclusive sense offers many jobs for volunteers. Some are obvious and easy, some obvious ones depend upon the type of supervision available. Few health organizations have tested the full range of possibilities.

See "The Volunteer—Asset or Liability?" and the accompanying article on "Lay Participation in Public Health Work," by K. H. Trawick. *Public Health Nursing*, 50 W. 50th St., New York. Nov., 1934. 35 cents. A reprint of "The Volunteer" alone, 10 cents.

Pictorial Diagrams—A goodly range of the Neurath type of "pictorial graphs," in black and white, is available in "Modern Social and Educational Trends." This is the Nov., 1934, issue of *Research Bulletin*, National Education Assn., 1201 16th St., N.W., Washington, D. C., 25 cents.

On the 46 pages appear 28 graphs or diagrams, the subjects ranging from age distribution of the population and infant mortality, to growth of national wealth and circulation of daily newspapers.

There are chapters on population and on health and vitality, but most of the

material will interest our readers, and the selection of diagrams will illustrate possibilities of this graphic form when printed in plain black and white. These examples were prepared by the N.E.A. with the assistance of Pictorial Statistics, 150 East 36th St., New York, N. Y.

A sample diagram is reproduced on this page.

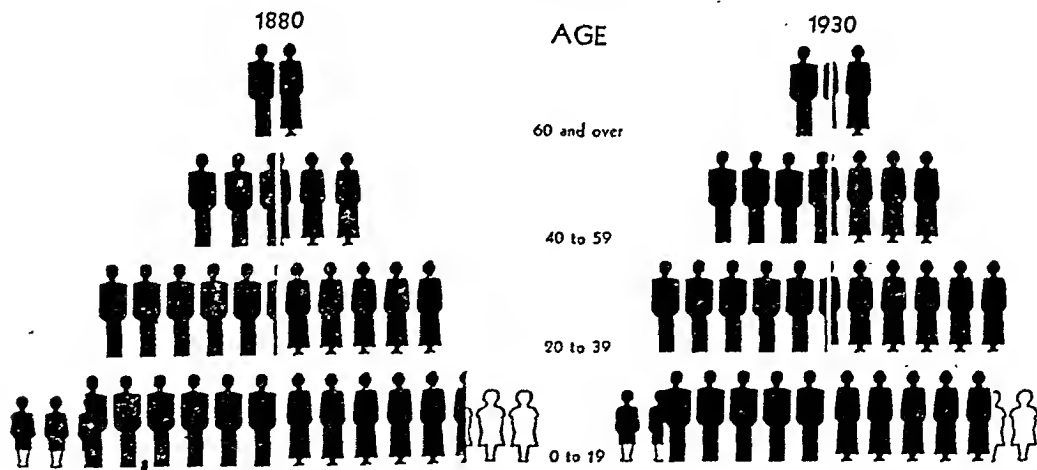
It Gives Prices and Addresses--The latest teacher's aid to reach us is "A Nutrition Program and Teaching Outline," "developed for use in the health centers and clinics of the Division of Child Hygiene, Dept. of Public Health, Philadelphia."

Of special interest to this department are the numerous lists of reference and teaching materials. As a rule prices (when not "free") and addresses of publishers are given. The chief exception is "Good Books for Reference (Available in Libraries)." Why not encourage and simplify the purchase of a few of those books by including prices and addresses?

One debatable paragraph reads:

Monthly or weekly publications of various city and state departments of health throughout the country are free on request. They

AGE DISTRIBUTION OF THE POPULATION



Each symbol represents 3 percent of total population

Ops Div., Nat Educ Assn

contain frequent articles on health and nutrition work pertinent to locality. New York City and Chicago Departments of Health have various attractive helpful publications.

One cannot but speculate as to the probability that "various city and state departments" will welcome requests from people outside of their respective territories.

The book should be useful in connection with emergency relief nutrition activities. Address Philadelphia Child Health Society, 311 S. Juniper St., Philadelphia, Pa. 156 pages. \$1.00.

Popular Health Topics in Hygeia—*Hygeia*, published by American Medical Assn., 535 N. Dearborn St., Chicago, Ill., for Dec., 1934, included the following and other material usable in numerous ways (single copy free to a health worker):

Human sterilization Sickness insurance and sickness costs The making and unmaking of a quack (part I) The meals of yesterday The psychology of the middle years The flea Physical examinations The problem of anemia Nobel prize winners in medicine (with portraits) The Wassermann test Speech problems in childhood Committee acceptance of sweets, sugars, and syrups Structural abnormalities of the eye Tuberculosis and the kings of France School and health, including Why measure

health teaching How can we judge the results of health teaching?

MAGAZINE ARTICLES

"Accidents Don't Just Happen," by F. Brutto. *Kiwanis Magazine*, 520 N. Michigan Ave., Chicago, Ill. Nov., 1934. 15 cents. "In Evanston (Ill.) accidents don't just happen. Neither did Evanston's record (of prevention) just happen." Material here for local articles all over the country.

"Buying Health" is the theme for the Dec., 1934, issue of *Survey Graphic*, edited by Mary Ross. Here is set up the problem as viewed from various angles—as officially stated by the leading organized groups—as interpreted by representatives of the groups most concerned. 30 cents. 112 E. 19th St., New York, N. Y.

"Health Insurance." *Nation*, 20 Vesey St., New York, N. Y. Dec. 12, 1934. 15 cents. "Health insurance is the most immediately practicable and financially possible form of economic-security legislation."

"Pity Poor Elizabeth Barrett! of Wimpole Street, Imprisoned in an Airless Room, Waiting for Death from Tuberculosis." Interesting and effective use of the well known poet to point the health moral. In *Everybody's Health*, 11 W. Summit Ave., St. Paul, Minn. Dec., 1934. 10 cents.

BOOKS AND REPORTS

Webster's New International Dictionary of the English Language, (2nd ed.). Unabridged. William Allan Neilson, Editor in Chief; Thomas A. Knott, General Editor; Paul W. Carhart, Managing Editor. Springfield, Mass.: G. & C. Merriam Co., 1934. 3210 pp. Price: \$20.00 to \$35.00 according to paper and binding.

One approaches the reviewing of a monumental achievement such as Webster's New International Dictionary with hesitancy. A review in the ordinary sense of the term is practically impossible.

The second edition of the well known Webster's Dictionary, which has since 1909 been called The New International, is the result of 10 years' work by 207 editors under the general supervision of Dr. William Allan Neilson, as Editor in Chief, and Dr. Thomas A. Knott, formerly Professor of English at the University of Iowa, as General Editor. It has more than 600,000 entries, 550,000 of which are in the vocabulary. There are 13,000 biographical entries and 35,000 entries in the Pronouncing Gazetteer.

The book opens, as did former editions, with the reproduction in color of the flags and arms of all nations, state flags and seals, etc. There are money tables, tables of weights and measures, signs used in writing and printing in the various arts and sciences, proof reading, and a vast amount of other information needed in everyday life, such as forms of address, and abbreviations, of which there are 5,000.

The writer, in editorial work, has occasion to read papers by those engaged in 10 different specialties and

these necessarily bring in many terms used in allied sciences. This review is therefore chiefly concerned as to the value of the work to the scientific man. Criticism from the literary and philological standpoints is left to specialists.

As has been pointed out in reviews of medical dictionaries in these columns, one can only select a number of test words. In looking these up one can judge of the clearness of expression, the ease of locating the information desired and the completeness of the references. These tests have been applied to a large number of terms, many of them quite new. The vocabulary of such terms is unusually full and surprisingly up to date. Lexicographers are necessarily somewhat slow in adopting new words and sometimes carry this caution to an extreme. Very few such instances have been discovered in the present work.

Under abbreviations, the many alphabetical names which have had their birth with the New Deal are given. However, as pointed out by some reviewers, "brain trust" and "crack-down" have not made the grade, though "applesauce" and "hot dog" have.

One of the chief differences in the make-up of this edition from the preceding one is the number of words which have been transferred from the "Lower Section" of the pages to the regular vocabulary. These are standard English words, except as indicated by usage labels, as obsolete, slang, etc.

There are 48 full-page plates, 32 of which are in colors, and 12,000 terms are pictorially illustrated. The History of the English Language, to which 58 pages of the introduction are given, can be especially commended. The printing and binding are excellent.

Webster has been for many years the standard of the *American Journal of Public Health*. All questions of spelling, pronunciation, usage, and meaning are settled by this Dictionary. While the present writer cannot speak for future editors, it is safe to say that as long as the publishers show the same enterprise as has been shown for more than 100 years, it will continue to be the standard reference for this *Journal*. Having seen and used the new edition, one wonders how it was possible to get on without it.

The Dictionary is obtainable in a number of bindings to suit the purse of everyone. The publication of this work was celebrated by the assembling of some 300 scholars and educators at a dinner in Springfield, Mass., at which the Editor in Chief and the General Editor presented the book to President Asa George Baker and Robert C. Munroe of the Merriam Company, and they in turn presented it to the world.

MAZÛCK P. RAVENEL

How to Succeed in Life—By Grenville Kleiser. New York: Funk & Wagnalls, 1934. 330 pp. Price, \$2.00.

An author who has produced no less than 28 other books, mostly on public speaking, offers in this somewhat jejune volume a procedure for the attainment of that elusive condition popularly known as "Success." In 8 chapters of approximately 40 pages each he advises his readers how to plan, sleep, eat, think, work, serve, do, and live well. None of it is very profound. There is no index.

JAMES A. TOBEY

Exercise Without Exercises—By S. Arthur Devan. New York: Dodd, Mead, 1934. 84 pp. Price, \$1.25.

This brief text seems built about the idea that the secret of good health rests in good posture (centered about the primary school idea of standing and

sitting "tall"), proper walking and breathing, and special development of abdominal muscle movements.

Although the author's knowledge of physical education apparently dates in the 19th century—he talks of "physical culture" and "physical culturists"—there are some good hints for the layman.

CHARLES H. KEENE

Physical Defects—The Pathway to Correction—*American Child Health Association, 50 West Fiftieth Street, New York, N. Y., 1934. 171 pp. Price, \$1.00.*

Here is enlightening research into the administrative methods of present school health programs. This book is particularly valuable in that it does not content itself with generalizations but offers definite conclusions and practical suggestions based on concrete facts. It is a specific answer to a specific question: "Why do so many school children continue to suffer from severe, uncorrected physical defects?" Since this question is being asked in so many communities, the answer suggested in this study is of interest to administrators of school health services throughout the country.

The writers of *Physical Defects—The Pathway to Correction* base their findings and conclusions not on theories but on direct inquiries in schools and homes. In the course of the study, research experts examined 25,000 children in 121 schools and talked with 579 teachers, 95 school nurses and with parents in 1,800 homes. The history of each child with a severe defect was checked, as completely as possible, from the time of his first school health examination. In this way the investigators discovered exactly where, when, and why he was dropped from the pathway to correction.

The most important finding is that, in general, school health services are attempting to carry on a much more

extensive program than can possibly be well done with funds and personnel available for it. The conclusions contain specific prescriptions for carrying on a more scientifically selected, and therefore more effective, program.

Every public health administrator, with any interest in school health service, should make specific use of the definite, practical suggestions and conclusions of this book.

CARL E. BUCK

On the State of the Public Health.

Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1933. *London: His Majesty's Stationery Office, 1934.* 295 pp. Price, 4s. 6d net.

The annual report of Sir George Newman is always interesting reading and the "Conclusions" are a liberal education in public health. This one is no exception.

There was a decrease in the births registered, to 580,413 against 613,972 in 1932—the lowest birth rate on record. Infant mortality fell from 65 to 64 per 1,000 births. There were 496,465 deaths against 484,129 in 1932. Suicides decreased by 89, or 1.5 per cent. There were 7,986 more violent deaths, chiefly road accidents, attributed to pedal cycles, than in 1932. Of 205,037 injuries and fatalities, 74,769 were "pedestrians."

The most promising field for improvement in the death rate from 15 to 20 lies principally in the prevention of tuberculosis among both sexes, and death due to accidents among males. While the tuberculosis situation has improved (death rate from pulmonary tuberculosis 993 per million in 1921–1930 to 799 in 1933), the relative slower rate of decline, or even a rise, in young women between 15 and 25 years, continues to give concern. It will be remembered that the appointment of authorized agents as tuberculosis officers

was recommended to coördinate under the Medical Officer of Health the various anti-tuberculosis activities. There are now in England and Wales 380–390 such officers, 459 tuberculosis dispensaries, and 26,773 sanatorium beds, against 5,700 in 1911.

Sir George refers to statements made now, as in 1904 and also in 1918, that as a race the English are deteriorating, that there is increase in the deaths attributed to cancer, heart disease, and preventable accidents, that large numbers of children are physically and mentally defective, that the physical condition of the recruits of the Army leaves much to be desired, that the maternal mortality remains practically the same and the nutrition of the people is not as good as it should be. Admitting the truth of some of these statements, on the whole he denies them. The improvement in the mortality rate 1–5 years is greater than that recorded in the first year of life, and from 15 to 20, the rate for 1921–1930 is only 39 per cent of that for 1861–1870. He considers that the evidence, taken as a whole, indicates that general health and nutrition was well maintained in spite of the economic and social difficulties, and that the health of the unemployed and their dependents is not suffering seriously or generally, though he recognizes the physical, mental, and social impairment associated with long unemployment. He does not claim that nutrition is as good as it might be for all, or that it is not capable of improvement. Education has done a great deal. The purchasing power of wages increased in 1933, and foods became cheaper, more available, and more varied, including an enormously increased consumption of fruits, apples, oranges, bananas, vegetables, eggs, fish, and dairy products.

Altogether the report is optimistic. We wish it were possible to give more space to it, and recommend its study.

MAZÛCK P. RAVENEL

The Housing Program of the City of Vienna—By *Charles O. Hardy and Robert R. Kuczynski*. Washington: *The Brookings Institution*, 1934. 143 pp. Price, \$2.00.

This is a timely presentation of a study of one of the most remarkable social experiments of modern times. Vienna's housing conditions have always been below the standard of large cities in Europe and America and for 20 years before the war there was almost continuous agitation for its reform. Taking an active part in this agitation was the public health group which rested its case chiefly on the efficacy of air and light as foes of tuberculosis. Not until after the war, however, did public housing construction become a necessity and an important part of the program of the Social Democratic party which then came into power in Vienna. The ideal professed by this party is the general principle that housing is a public service to be rendered without charge as are school houses, hospitals, and jails. In their actual program, however, capital costs but not operating expenses were taken into consideration. These costs averaged as low as \$16 per year in rent for apartments consisting of living room, sleeping room, and kitchen. Central bathing facilities were provided in the larger apartment units which the authors estimate were run at much less than full capacity averaging 11 baths per person per year.

The natural questions as to whether party members were favored in allocation of dwellings the authors have answered to their satisfaction. People are human everywhere.

Public health workers in this country have been on the whole peculiarly apathetic to problems of housing. True, the New York State Department of Health assisted in drafting a model building code for adoption by cities and villages in the state. But experience in Great Britain would indicate that

American health officials must concern themselves with the problem of housing if they are to control disease most effectively. Incidentally, Great Britain is now demonstrating that the housing problem can be solved with private capital.

Health officers, engineers, and social workers will find this book most useful in clarifying thoughts on a question which must concern them in an increasing measure. It points out many of the incidental problems that we must solve before advancing in the field of planned housing.

The subject is presented, logically, clearly and interestingly. The book would be helped by a more detailed index.

HOMER N. CALVER

O Problema de Limpeza Publica—By *Lincoln Continentino, C.E.* *Bello Horizonte: Imprensa Oficial de Minas Geraes*, 1932. 344 pp.

The author, a former professor of the Engineering School of the University of Minas Geraes and at present Chief State Sanitary Inspector, in writing his book, had chiefly in mind the collection of data which might help municipal authorities and experts in his country in solving a problem, refuse disposal, facing all towns both in its sanitary and esthetic phases. For that purpose, he has drawn on his own observations when taking a post-graduate course in the United States and on the available literature. In accordance with accepted style, the subject is studied by him under the four headings of home preparation, collection, separation and classification, and disposal. Street cleaning is considered in a separate section. Methods in use in some American and European cities are discussed. The latter are considered preferable since they depend on cremation and do not stress, as in the United States, the use of products of the conversion, with its

hygienic disadvantages. Since the subject is, as a whole, conservatively handled, the book should prove useful for informative purposes to the audience for which it is intended. A number of photographs (not especially well produced) and diagrams add to the value of the work.

Regrets are expressed that Americans, with their recognized leadership in sanitary engineering, seem apparently to lag behind Europe in the field of refuse disposal, and even admit that Germany and England are more advanced in this respect.

To the few American readers familiar with Portuguese the most interesting part will be that dealing with conditions in Brazilian towns as Rio, São Paulo, Recife and Bello Horizonte. A questionnaire sent to other cities remained unanswered.

A deserved tribute is paid to Saturnino de Britto and his pioneer work in providing Brazilian cities with water supplies and sewage disposal systems.

Altogether this is a meritorious book which within its scope must contribute to the development of sanitary engineering in Brazil. A. A. MOLL

BOOKS RECEIVED

AMERICAN MEDICINE. By Henry E. Sigerist. New York: Norton, 1934. 316 pp. Price, \$4.00.

ESSENTIALS OF INFANT FEEDING AND PEDIATRIC PRACTICE. By Henry P. Wright. New York: Oxford, 1934. 222 pp. Price, \$4.25.

CLINICAL LABORATORY METHODS. By Pauline S. Dimmitt. Philadelphia: Davis, 1934. 156 pp. Price, \$2.00.

SWIMMING, BATH WATER PURIFICATION FROM THE PUBLIC HEALTH STANDPOINT. By F. Wilkinson and F. J. Forty. London: Contractors' Record, 1934. 264 pp. Price, \$3.75.

A NUTRITION PROGRAM AND TEACHING OUTLINE. By the Philadelphia Child Health Society. Philadelphia: Philadelphia Child Health Society, 1934. 156 pp. Price, \$1.00.

BIRTH CONTROL, ITS USE AND MISUSE. By Dorothy Dunbar Bromley. New York: Harper, 1934. 304 pp. Price, \$2.50.

A COLLEGE TEXTBOOK OF HYGIENE. Revised Edition. By Dean Franklin Smiley and Adrian Gordon Gold. New York: Macmillan, 1934. 383 pp. Price, \$2.00.

THE ADVANCE OF SCIENCE. Edited by Watson Davis. Garden City: Doubleday Doran, 1934. 400 pp. Price, \$3.50.

THE LIFE OF SIR ROBERT JONES. By Frederick Watson. Baltimore: Wood, 1934. 327 pp. Price, \$3.75.

TRAINING IN PSYCHIATRIC SOCIAL WORK AT THE INSTITUTE FOR CHILD GUIDANCE, 1927-1933. By Sarah H. Swift. New York: Commonwealth, 1934. 177 pp. Price, \$1.75.

TREATMENT BY DIET. By Clifford J. Barboka. Philadelphia: Lippincott, 1934. 613 pp. Price, \$5.00.

ADMINISTRATION OF HEALTH AND PHYSICAL EDUCATION. By Jesse Feiring Williams and Clifford Lee Brownell. Philadelphia: Saunders, 1934. 598 pp. Price, \$3.00.

PERIODIC FERTILITY AND STERILITY IN WOMAN. A Natural Method of Birth Control. By Prof. Hermann Knaus. Trans. by D. H. Kitchin. Vienna: Wilhelm Maudrich, 1934. 162 pp. Price, \$6.50.

THE ADOLESCENT IN THE FAMILY. A Study of Personality Development in the Home Environment. White House Conference on Child Health Protection. New York: Appleton-Century, 1934. 473 pp. Price, \$3.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Laboratory Experiments With Influenza—Mice are susceptible to the virus of human (and swine) influenza. The virus, when isolated from mice, is neutralized by anti-serum from other animals.

ANDREWES, C. H., *et al.* The Susceptibility of Mice to the Virus of Human and Swine Influenza. *Lancet* 2, 16:859 (Oct. 20), 1934.

Men, Mice and Microbes—The biology of the host-parasite relationship is discussed in illuminating detail, most of which is entirely foreign to the thinking of work-a-day sanitarians.

BREWER, D. The Development of the Theory of Epidemics During the Present Century. *Pub. Health* 48, 2:69 (Nov.), 1934.

Why Slums Must Go—An attempt is made to trace specific directions in which poor housing affects health. Among the many reasons are impure water supply, insanitary sewage disposal, lack of private toilets and sewer connections, overcrowding, lack of light and air, dilapidation.

BRITTEN, R. H. The Relation Between Housing and Health. *Pub. Health Rep.* 49, 44:1301 (Nov. 2), 1934.

Amebic Dysentery Controlled—Briefly reviewed is the whole story of the late Chicago amebic dysentery epidemic, illustrating well the danger of accepting conclusions unchallenged, and showing the difficulties involved in completely reorganizing epidemiologic procedure. A stimulating paper.

BUNDESEN, H. N. The Chicago Epidemic of Amebic Dysentery in 1933. *Pub. Health Rep.* 49, 43:1266 (Oct. 26), 1934.

What To Do With Garbage—The failings of present methods of garbage collection and disposal serve as an introduction to the second paper which discusses the feasibility of home disposal of food wastes ground and flushed into sewers. It would be fine for apartment dwellers if the sewage works could stand the extra load.

COHN, M. M. The Dual Disposal of Sewage. *Municipal Sanitation.* 5, 10:332 (Oct.), 1934 (and) 5, 11:368 (Nov.), 1934.

All Colds Are Not Alike—Epidemiological differences exist between head colds, sore throats and chest colds when the presence of fever is considered in relation to the type of infection.

COLLINS, S. D., and GOVER, M. Age and Seasonal Incidence of Minor Respiratory Attacks Classified According to Clinical Symptoms. *Am. J. Hyg.* 20, 3:533 (Nov.), 1934.

Sex Differences in Pneumonia Mortality—During childhood more boys than girls die of pneumonia, due presumably to inherited susceptibility. The difference disappears temporarily at puberty. In adolescent years excess rates for males are presumably due to a variety of factors. From 20 to 69 the male death rate excess may be attributable to occupational hazards, for the male excess disappears in certain rural regions. In old age the female rate usually is greater than the male, probably because only the tough men are left.

DOULL, J. A., *et al.* The Sex Ratio of Pneumonia Mortality and Its Possible Relation to Occupation. *Am. J. Hyg.* 20, 3:628 (Nov.), 1934.

Why Bowels Balk—Dosing from infancy onward and bad habits, more than insufficient bulk in diet, are the causes of constipation. The Friday night purge is as much an institution as the Saturday night bath in most British families favored with youngsters.

GREGORY, H. H. C. The Prevention of Constipation in Children. *J. State Med.* 42, 11:632 (Nov.), 1934.

More Arguments For Pasteurization—Five outbreaks of food poisoning from which staphylococci were isolated are added to the record. No uniform biological or serological characteristics are evident. Raw milk and cream and human contact are the most likely vectors.

JORDAN, E. O., and BURROWS, W. Further Observations on Staphylococcus Food Poisoning. *Am. J. Hyg.* 20, 3:604 (Nov.), 1934.

Does Childhood Tuberculosis Protect?—The initial tuberculosis infection carries a double liability: the bacilli remain alive indefinitely and liable to be set free; the allergy resulting from the first invasion converts the comparatively harmless protein of succeeding tubercle bacilli into a virulent poison.

MYERS, J. A., and HARRINGTON, F. E. The Effect of Initial Tuberculous Infection on Subsequent Tuberculous Lesions. *J.A.M.A.* 103, 20:1530 (Nov. 17), 1934.

Errors in Phenol Coefficients—Any small deviation from prescribed conditions for determination of survival times in phenol coefficient tests may produce differences in the resistance of the culture. Errors may be large for slight deviations in technic. A 1° difference in temperature of incubation of the culture will cause a significant difference in its resistance to phenol. A two-hour difference in the age of the culture is significant when tests are made at 15 second intervals, and a four-hour difference in age will affect results from 5 minute interval tests.

SMYTH, H. F., Jr. Evaluation of Some

Factors Influencing the Phenol Resistance of Staphylococcus Aureus. *J. Bact.* 28, 4:333 (Oct.), 1934.

Agglutinin Response to Vaccine—O agglutinin formation takes place as readily with suitable anti-enteric vaccines as it does during enteric disease. However, a better response is obtained with freshly prepared antigens than with those that have been exposed to the usual concentrations of phenol even for a short time.

STUART, G., and KRIKORIAN, K. S. Agglutinin Response to Recent Anti-Enteric Vaccination. *Lancet* 227, 5795:644 (Sept. 22), 1934.

Varieties of Typhus Fever—Brills disease is an imported form of European louse-borne typhus fever and is distinct from the Mexican rat-flea-borne type of the disease.

ZINSSER, H. Varieties of Typhus Virus and the Epidemiology of the American Form of European Typhus Fever (Brills Disease). *Am. J. Hyg.* 20, 3:513 (Nov.), 1934.

Pro BCG—Calmette's vaccine prevents tuberculous infection in the exposed infants under observation, reports this Swedish researcher.

WALLGREN, A. Value of Calmette Vaccination in Prevention of Tuberculosis in Childhood. *J.A.M.A.* 103, 18:1341 (Nov. 3), 1934.

Birth Reporting Deficiencies—Estimates of the completeness of birth reporting in each state are of great value to anyone using statistics seriously. Some states have practically perfect reporting, but others have obviously slumped since admission to the Registration Area. Nineteen were estimated to rate below 90 per cent completeness in 1930. One state showed only 72 per cent completeness for whites and 30 per cent for colored. Infant mortality rates are lowered appreciably through use of the author's corrected birth figures.

WHELPTON, P. K. The Completeness of Birth Reporting in the United States. *J. Am. Stat. Assn.* 24, 186:125 (June), 1934.

ASSOCIATION NEWS

SIXTY-FOURTH ANNUAL MEETING

MILWAUKEE, OCTOBER 7-10, 1935

Headquarters: Hotel Schroeder

COMMITTEE ON PROFESSIONAL EDUCATION MEETING

A MEETING of the Committee on Professional Education was held in New York on December 8. It will be remembered that this committee is charged with the carrying out of research and the development of standards for professional education and training in public health work, and the performance of necessary activities with a view to maintaining professional qualifications of high standard.

Accordingly, the committee, through its various sub-committees, has been giving consideration to the problem of minimum qualifications and training of health officers, sanitary engineers, sanitary inspectors, and public health nurses. It is hoped in time to extend

these studies to other professional groups. Studies in coöperation with other agencies have been carried on to determine minimum requirements which it is felt persons entering the public health field should possess.

The committee has concerned itself with the question of teaching preventive medicine in medical schools, and is hopeful that a plan may be worked out to interest institutions in the desirability of giving increased consideration to this problem.

It is planned to hold another meeting of the committee early in the summer and to consider recommendations for presentation at the Milwaukee Annual Meeting.

COMMITTEE ON RESEARCH AND STANDARDS MEETING

THE Executive Committee of the Committee on Research and Standards met in New York on December 6 and devoted considerable time to the question of the status of various standards of the Association.

It is planned to publish in an early issue of the *Journal* a list of Association publications and standards, indicating their present status, and in many instances the expected date of revision. Such a statement should prove of value to the membership, since the standards in question cover

many phases of public health work.

The Sub-Committee on Communicable Disease Control is actively engaged in a revision of the pamphlet on Communicable Diseases, and hopes to have it available within a few months.

The referee on Shellfish Examination reported that a revision of Standard Methods for the Examination of Shellfish will be undertaken during the year.

The committee has also interested itself in many other pertinent problems, and will follow an ambitious program during the coming year.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

- Samuel G. Arnold, M.D., 209 City Hall, Long Beach, Calif., Health Officer
 Nolton N. Ashley, M.D., City Hall, Oakland, Calif., City Health Officer
 Albert M. Price, C.P.H., 1580 Jackson St., Charleston, W. Va., Director of Rural Sanitation, State Department of Health
 Claude A. Thomas, M.D., 212 W. Burke St., Martinsburg, W. Va., Berkeley County Health Officer
 Edward P. White, M.D., Gaffney, S. C., Director, Cherokee County Health Department

Vital Statistics Section

- Edward B. Bosworth, C.P.H., 121 Whitney Ave., New Haven, Conn., Statistician, Department of Health

Public Health Engineering Section

- Roy B. Everson, 627 W. Lake St., Chicago, Ill., Everson Filter Company
 Fujio Kashiwara, 701 W. Illinois St., Urbana, Ill., Assistant Sanitary Engineer, South Manchuria Railway Company

Industrial Hygiene Section

- Violet H. Hodgson, Department of Health, White Plains, N. Y., Director, Division of Public Health Nursing
 Francis R. Holden, Ph.D., Belle Field Apts., Detroit, Mich., Chemist, Industrial Health Conservancy Laboratories.

Food and Nutrition Section

- Francis P. Griffiths, M.S., Department of Bacteriology, Mass. State College, Amherst, Mass., Junior Bacteriologist, U. S. Bureau of Fisheries
 William E. Krauss, Ph.D., Ohio Agr. Experiment Station, Wooster, O., Research Worker in Nutrition
 Minna Stitch, Hunter College, Bronx Bldgs., Bedford Park Blvd. & Navy Ave., New York
 Mark H. Wodlinger, 400 W. Madison Street, Chicago, Ill., President, American Research Products, Inc.

Child Hygiene Section

- Marguerite M. Hussey, Ph.D., Box 45, Park Ridge, N. J., Teaching in School of Education, New York University

Public Health Education Section

- Violet R. Ward, B.A., 54 Stratford Rd., Berkeley, Calif., Supervisor of Health Education, Berkeley School System

Public Health Nursing Section

- Lydia R. Sheall, R.N., 1806 Maple Ave., Evanston, Ill., Superintendent, Visiting Nurse Assn.
 Juanita R. Zamora, Thermal, Calif., School Nurse

Epidemiology Section

- Henry T. Dean, D.D.S., U. S. Public Health Service, Washington, D. C., Dental Surgeon
 Salvador Riera-Lopez, M.D., C.P.H., Department of Health, San Juan, P. R., Epidemiologist

DECEASED MEMBERS

- H. L. Akridge, M.D., Brunswick, Ga., Elected Member 1923, Fellow 1929
 W. G. Hollingworth, D.V.S., Utica, N.Y., Elected Member 1919, Fellow 1926
 Vernon Robins, M.D., Louisville, Ky., Elected Member 1916, Fellow 1922
 F. W. Sears, M.D., Syracuse, N. Y., Elected Member 1914, Fellow 1922
 Dr. John H. Blanks, Zion, Ill., Elected Member 1925
 E. Pauline Bledsoe, McPherson, Kans., Elected Member 1933
 Nelson C. Davis, M.D., Bahia, Brazil, S.A., Elected Member 1923
 George W. Hunter, Ph.D., Claremont, Calif., Elected Member 1928
 Fred J. MacDonald, M.D., Schenectady, N. Y., Elected Member 1931
 Paul F. Nichols, M.S., Berkeley, Calif., Elected Member 1934.
 Dr. James M. Parrott, Raleigh, N. C., Elected Member 1932
 Charles V. Roman, M.D., Nashville, Tenn., Elected Member 1926

NEWS FROM THE FIELD

OHIO FEDERATION OF PUBLIC HEALTH OFFICIALS

THE Ohio Federation of Public Health Officials held its annual meeting at the Deshler Hotel, Columbus, Ohio, November 14-16, in co-operation with the Ohio Health Commissioners Conference conducted by the State Department of Health.

The following officers were elected:

President, Dr. W. G. Rhoten, Wooster

Vice-President, Dr. A. G. Sturgiss, Marietta

Secretary-Treasurer, Dr. W. D. Bishop, Greenville

Representative on the Governing Council, A.P.H.A., Dr. G. D. Lummis, Middletown.

The principal speaker for the Federation was Dr. Joseph Mountin of the U. S. Public Health Service, who has been in Ohio for some time making a study of Health Administration in county government. His subject was "Public Health Administration under County Government Amendment."

The attendance at this meeting was approximately 350, representing health commissioners, nurses, and sanitary officers.

MICHIGAN'S PUBLIC HEALTH CONFERENCE

THE Fourteenth Annual Public Health Conference of the Michigan Public Health Association and the Michigan Department of Health, held in Lansing on November 7-9, attracted a record attendance of 440 health officers, public health nurses, sanitary officers, and laboratory workers. All but 15 of the state's 83 counties were represented, Wayne County sending 70 members.

Officers of the Michigan Public Health Association elected at the Annual Business Meeting are as follows:

President—Dr. B. W. Carey, Detroit

Vice-President—Dr. G. M. Byington, Battle Creek

Secretary-Treasurer — Marjorie Delavan, Lansing

Directors for 2 year terms—Dr. V. K. Volk, Pontiac; Dr. William R. Davis, Lansing; and Mrs. Hugh Gaston, R.N., Sault Ste. Marie

Representative on Governing Council of A.P.H.A.—Dr. C. C. Slemmons, Lansing

MEETING OF WEST VIRGINIA PUBLIC HEALTH ASSOCIATION

THE recent Annual Meeting of the West Virginia Public Health Association, held jointly with the Public Health Officers' Conference, was in every way successful, with an attendance of 350-400 health workers from all fields.

The following officers were elected for 1935:

Dr. T. E. Cato, *President*—New Cumberland

Dr. A. J. Kemper, *First Vice-President*—Clarksburg

Dr. E. R. Davies, *Second Vice-President*—Kingwood

Dr. John Thames, *Secretary-Treasurer*, Charleston

Dr. John Thames, *Representative on Governing Council*, A.P.H.A., Charleston

FLORIDA PUBLIC HEALTH MEETING

THE sixth annual meeting of the Florida Public Health Association was held in Jacksonville, Fla., December 3-5, at the Mayflower Hotel.

The following officers were elected:

President—George N. MacDonnell, M.D., Miami

First Vice-President—N. A. Upchurch, M.D., Jacksonville

Second Vice-President—Johanna L. Sogaard, Jacksonville

Secretary-Treasurer—Stewart G. Thompson, D.P.H., Jacksonville

The program was of unusual interest and included important papers from many leading authorities from various states. The meeting was called to order by the President, Dr. J. R. McEachern, who is City Health Officer of Tampa.

Dr. McEachern's presidential address will appear in the January number of the *Florida Health Notes*. Some of the titles of papers presented were:

Pulmonary Spirochetosis; County Health Units; Early History of Vaccination Against Smallpox; Rural Health Service; Some Health Problems Regarding Parasitic Diseases Transmitted by Insects; Dengue in Miami; Significance of Dengue Epidemic; Food Inspection; Pellagra; Public Health Nursing; FERA Social Service and Public Health Program; Nursing Among Seminole Indians; Screw Worm Infestation in Florida; Progress in Sand Fly Control.

NATIONAL ACADEMY OF MEDICINE OF MEXICO ELECTS OFFICERS

THE newly appointed officers of the Academia Nacional de Medicina de Mexico are:

President, Francisco de P. Miranda, M.D.

Vice-President, Dr. Gustavo Baz

Permanent Secretary, Dr. Alfonso Pruneda
Annual Secretary, Miguel E. Bustamante,
Dr.P.H.

Treasurer, Dr. Ramón Pardo

Dr. Miranda and Dr. Bustamante are members of the A.P.H.A.

CONFERENCE ON CHILDREN'S NEEDS

THE National Conference on the 1935 Needs of Children will be held under the auspices of *The Parents' Magazine*, January 3-4, at the Pennsylvania Hotel, New York.

Among the speakers will be Fiorello H. LaGuardia, Mayor of New York, on "Child Labor Must Go Forever"; Miss Grace Abbott, Retiring Chief, U. S. Children's Bureau, on "The Forgotten Child"; Aubrey Williams, Assistant Federal Relief Administrator,

on "Children of the Unemployed"; Owen R. Lovejoy, Secretary of the Children's Aid Society of New York, on "Homeless Boys and Girls on the March."

AMERICAN STUDENT HEALTH ASSOCIATION MEETS

THE Fifteenth Annual Meeting of The American Student Health Association was held in New York December 27-28, in conjunction with The College Physical Education Association, The American Football Coaches' Association, and The National Collegiate Athletic Association.

INTERNATIONAL NURSING REVIEW DISCONTINUED

THE President of the International Council of Nurses, of Geneva, Switzerland, advises that with the issue of Volume IX of *The International Nursing Review*, dated 1934, further publication of that *Review* has been indefinitely suspended, pending the decision by the Board of Directors as to the further policy they propose to adopt with reference to the same. The question will come before the Board at their next meeting in 1935.

Subscriptions which have been received in advance will be held in suspense until the Board have arrived at a decision with regard to the future of this publication.

AMERICAN FOUNDATION FOR THE BLIND

THE cornerstone has been laid of the new home of the American Foundation for the Blind, at 15 West 16 St., New York.

Speakers at the ceremonies held on December 5 included: Dr. John H. Finley; Helen Keller; M. C. Migel, who gave the land and the 3-story building; and H. R. Latimer, of the Pennsylvania Association for the Blind of Pittsburgh.

Dr. Finley read a letter from President Roosevelt saying he was "very happy indeed to accept the honorary presidency of the American Foundation for the Blind." A telegram was also received from the President, too late to be read at the ceremony.

Into a copper box, placed within the cornerstone, were put autographed photographs of Miss Keller and Mrs. Anne Sullivan Macy her teacher, a talking book record of Mr. Migel's remarks, reports of the Foundation since its origin in 1923, copies of the publication, *Outlook for the Blind*, newspapers for Dec. 4 and 5, and several coins.

At a meeting which followed, Mr. Migel was reelected president of the Foundation; Prudence Sherwin, vice-president; Dr. Burritt, secretary, and Mr. Ziegler, treasurer.

HOW DOCTORS HELP INDUSTRY

A MAN hiring into our shops is medically examined and given work that fits his condition. Disability does not necessarily bar him from a job. Twenty per cent of our present workmen are in the physically disabled class. Some are blind, some deformed, some not very strong—there are twelve thousand of them in all—and each man's work is selected to fit his case. Tuberculous men have sheltered places in the open air. By a system of medical transfers men's jobs may be changed at any time for health reasons.

Our doctors daily inspect all food served to the men and see that lunches are eaten under proper conditions. Even oil used in the machinery is treated with an antiseptic solution to prevent infection of hands or arms. When the bacteria count of the oil in a machine pit is high, the pit is drained, scalded with live steam, and thoroughly scrubbed. In some instances a protective ointment is provided which men rub

on their hands and arms before commencing work. There are many such precautions. . . .— *How Doctors Help Industry*, Radio Talk, W. J. Cameron Ford, Sunday Evening Hour.

CHILD HEALTH CONFERENCES IN IOWA NEXT YEAR

AT the invitation of the University of Iowa, the Eighth Health Education Conference of the American Child Health Association will be held in Iowa City, June 19–22, 1935.

The Conference will be held in conjunction with the Ninth Annual Iowa Conference on Child Development and Parent Education, which is scheduled for June 17–19.

TERM OF BALTIMORE HEALTH COM- MISSIONER EXTENDED

UNDER a recent amendment to the city charter, the term of the Health Commissioner of Baltimore is now 6 years instead of the previous 4-year appointment. It provides that Dr. Huntington Williams's term will expire October 1, 1938, instead of October 1, 1935. The change was a part of the charter revision program sponsored by Mayor Jackson, and will, he expects, take the position of health commissioner out of politics.

The amendment also makes it mandatory for a candidate for this office to have at least 5 years' actual experience in public health work performed by departments of federal, state or municipal governments.

BAD HOUSING

IT has been stated by N. H. Engle, of the U. S. Bureau of Foreign and Domestic Commerce, that—

In 64 cities more than 600,000 homes had neither bathtub nor shower, and nearly 450,000 were without indoor water closets. These figures comprise 23 and 17 per cent respectively of all residential units surveyed.

In a recent statement, Clarence E. Pickett, of the Division of Subsistence Homesteads, U. S. Department of the Interior, said:

While we have built the façade of abundant production higher and higher until its foundations became inadequate to sustain it, we have neglected consideration for the effect of bad housing . . . upon health and upon family life.

—*Public Housing Progress*, Nov. 15, 1934.

THE SLUM PROBLEM

ONE-THIRD of our countrymen are living in scattered hovels, in cluttered shacks, in the squalid flats of congested centers, with common toilets, with dark rooms on fetid shafts; we know from statistics that they are easy victims of chronic ailment and devastating disease, contributing to juvenile delinquency, to gang crime, to gang politics. Such is the slum problem.—*Public Housing Progress*, Nov. 15, 1934.

PERSONALS

HENRY R. O'BRIEN, M.D., A.P.H.A., of Oberlin, Ohio, formerly Health Commissioner of Lorain County, Ohio, has been appointed Assistant District Health Officer of the New York State Department of Health.

WILLIAM A. HOWE, M.D., member A.P.H.A., Chief of the Medical Inspection Bureau of the New York State Education Department, retired October 1, after being associated with the department since 1915.

PHILIP J. RAFLE, M.D., member A.P.H.A., of the New York State Department of Health at Albany, has been appointed temporary District Health Officer with headquarters in Syracuse to succeed the late Dr. Frederick W. Sears.

DR. JAMES A. FAULKNER, of Belleville, Ont., has been appointed Minister of Health for Ontario, Canada, succeeding Dr. John M. Robb, member A.P.H.A.

DR. STANLEY R. PARKINSON, of Marysville, Calif., succeeds Dr. James H. Barr as Health Officer of Yuba County.

DR. DENVER D. ROOS has been appointed Health Officer of Corona, Calif., following the retirement of Dr. William S. Davis.

WILLIAM C. FOWLER, M.D., member A.P.H.A., of Washington, D. C., Health Officer of the District since 1918, retired as of Nov. 24. No successor to Dr. Fowler has been announced, but Dr. Edward J. Schwartz will be acting Health Officer.

ERNEST L. STEBBINS, M.D., member A.P.H.A., has resigned as Health Officer of Henrico County, Va., to join the staff of the New York State Department of Health, at Albany, N. Y.

DR. CHARLES NORRIS, who has been Chief Medical Examiner of New York City since 1918, was presented with a gold medal by the New York Academy of Medicine for his outstanding work in forensic medicine. Dr. Norris entered the city's service in 1904.

DEATH

NOTICE has been received of the death of Lemar M. Andrews, M.D., Health Officer of Warsaw, N. Y., member A.P.H.A.

CONFERENCES

Mar. 27–29, Canadian Section, American Water Works Association, London, Ont., Canada.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

February, 1935

Number 2

Value of the Fluoroscope in Pulmonary Tuberculosis Case Finding*

HAYNES HAROLD FELLOWS, M.D.

*Assistant Medical Director, Metropolitan Life Insurance Company,
New York, N. Y.*

IN the early part of 1927 we in the Medical Division at the Home Office of the Metropolitan Life Insurance Company were trying to find a solution to a tuberculosis problem which had been causing concern for a long time. Employees would occasionally report to the Dispensary complaining of typical symptoms of tuberculosis, although a satisfactory physical examination of the chest had been made a short time before. This happened in spite of the fact that our examining staff was made up of competent physicians, each one connected with hospital, clinic, or teaching institution, and some of them particularly trained in the diagnosis of diseases of the lungs. To complicate matters still more, we were seeing employees whose roentgenograms showed a lesion typical of pulmonary tuberculosis who had neither symptoms nor physical signs of pulmonary disease. With this evidence, we realized that even relatively large pulmonary lesions might not produce detectable signs or give any symp-

toms whatsoever. Incidentally, this was not as well known then as now.

We believed that for purposes of accurate diagnosis a routine X-ray examination of the chest would be ideal, but the technical problem of making the requisite 17,000 or more roentgenograms yearly was great and the question of expense was not ignored. Our problem was to find an accurate, rapid, economical way of selecting the proper cases for further X-ray study. It was decided to try fluoroscopy on a series of cases with the hope that this method of examination would fulfil the requirements. Consequently, in October, 1927, 100 individuals were examined physically, fluoroscopically and roentgenographically, and the results justified further trial.

In the first 7 months of this experiment 3,300 applicants for employment were examined, the examination consisting of the usual medical and personal history and physical and fluoroscopic examination. In this group we found 37 individuals whom we would have accepted after the physical examination, but who, after a fluoroscopic

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

examination, were classified as "abnormal chests," and then after X-ray examination were classified as having a lesion typical of pulmonary tuberculosis. We were convinced that we were on the right track and since that time have adhered to this method.

Our problem now divided itself naturally into two parts, the detection of pulmonary tuberculosis—(1) among applicants for employment and (2) among our Home Office employees.

From January, 1928, through December, 1933, 17,765 applicants for employment were examined, of whom about 95 per cent were girls and 5 per cent boys. The average age in this group was about 18 years. Among these applicants there were 244 persons whose roentgenograms showed a lesion typical of pulmonary tuberculosis (see Table I).

many of these applicants rejected because of chest lesions. We were able to follow closely 42 cases; the remaining 27 cases dropped from sight in spite of all efforts. The results were enlightening. Within the year we found by X-ray that 21, exactly one-half of the cases followed, had either a spread, or were complaining of symptoms denoting activity, or were developing abnormal physical signs, or already had been admitted to a sanatorium or hospital for treatment. Since starting this work we have been able to reexamine and advise 75 per cent of the applicants rejected because of the presence of pulmonary tuberculosis, most of whom were in need of immediate treatment.

The findings among Home Office employees are given in Tables II and III. Table II shows the decreasing number

TABLE I
INCIDENCE OF PULMONARY TUBERCULOSIS AND METHOD OF DETECTION
AMONG APPLICANTS FOR EMPLOYMENT
HOME OFFICE, METROPOLITAN LIFE INSURANCE COMPANY
1928-1933

Year	Number of Applicants	Cases of Pulmonary Tuberculosis and Method of Detection					
		Total		Suggestive History	Suggestive Physical Signs	Fluoroscopy Only	
		Number	Rate per 1,000 Applicants			Number	Per Cent of Total
1928-33	17,765	244	13.7	25	19	200	82
1928	4,405	169	15.7	9	7	53	77
1929	4,780	157	11.9	6	6	45	79
1930	3,105	36	11.6	3	1	32	89
1931	2,175	33	15.2	2	4	27	82
1932	2,134	32	15.0	2	0	30	94
1933	1,166	17	14.6	3	1	13	76

Because of the personal and public health aspects involved, we did not feel that our interest or responsibility ended with a refusal to employ these people. Consequently, we reexamined, advised, and did all we could to help in the proper disposition of these cases. During the first year we also secured additional and subsequent information upon

of new cases of tuberculosis detected yearly. The decrease is due largely to the detection and classification in 1928 and 1929 of the healed cases among the older employees, and also to the fact that we are not now employing persons with demonstrable tuberculous lesions. Table III shows decrease by years in the number of cases needing treatment.

TABLE II

CASES OF PULMONARY TUBERCULOSIS (ACTIVE, ACTIVITY QUESTIONABLE, APPARENTLY HEALED) DETECTED AMONG EMPLOYEES OF THE HOME OFFICE, METROPOLITAN LIFE INSURANCE COMPANY
1928-1933

Year	Number of Employees	Cases of Tuberculosis Diagnosed	Rate per 1,000 Employees
1928	11,530	106	9.2
1929	11,966	85	7.1
1930	12,468	71	5.7
1931	13,081	72	5.5
1932	13,582	59	4.3
1933	13,960	42	3.0

TABLE III

CASES OF ACTIVE PULMONARY TUBERCULOSIS AND METHOD OF DETECTION AMONG EMPLOYEES OF THE HOME OFFICE, METROPOLITAN LIFE INSURANCE COMPANY
1929-1933

Year	Total		Suggestive History or Physical Signs	Fluorosc- copy	Others (Routine X-ray Retake, etc.)
	Cases	Rate per 1,000 Employees			
1929	33	2.8	18	15	0
1930	29	2.3	17	12	0
1931	29	2.2	22	5	2
1932	33	2.4	20	8	5
1933	20	1.4	6	13	1

The results can be summarized by saying that we believe that we are not now employing persons with pulmonary tuberculosis and we are everlastingly alert to detect this disease in our Home Office employees at the earliest stage.

And, curiously, our endeavors have brought us face to face with another phase of the problem which is now causing some perplexity. For years we have been encountering individuals whose chest roentgenograms show evidence of a typical tuberculous lesion, who are asymptomatic and demonstrate no abnormal physical signs. Among the company employees we have advised and urged the younger ones and those whose lesions are shown to be unstable by X-ray examination to take treatment at the company sanatorium at Mount

McGregor, and have allowed the others to work under very close observation. So far, we believe we have made no mistake. An analysis of 141 cases diagnosed as tuberculous subsequent to a negative X-ray or negative fluoroscopic examination shows that significant pulmonary tuberculosis may develop in the late adolescent and adult, that it is possible to detect many of these cases at a stage before physical signs or symptoms can be elicited, that some of these cases follow an unsatisfactory course while others are cured without untoward incident at our sanatorium. It is not possible to foretell which case will react favorably and which unfavorably, so we believe that the safest method is to advise the younger members of such a group to take sanatorium

treatment under favorable circumstances, and to keep the older individuals under close medical observation.

After 7 years' experience with our present routine of chest examination, we believe that we have made real progress in handling our pulmonary tuberculosis problem. Realizing that a physical examination, no matter how painstakingly done, does not reveal ab-

normal signs in a large number of tuberculous cases, we have met this shortcoming by adding a routine fluoroscopic examination and a roentgenographic examination of cases selected by this method for further study. From the administrative standpoint, this method is rapid and economical; as checked by X-ray examination, it is accurate.

Our Front Window

WHILE we watched a drug clerk meticulously attach a label to a prescription the other day, we wondered how long this business of labeling merchandise had been going on. So we found out. At the Ever Ready Label Corporation in New York they know a lot of curious things about labels. One of them is that cattle were probably the first articles of commerce to be labeled—by brands, too!

Wooden labels for mummy cases came along about 1000 B.C. From the same period, on a bamboo container, this inscription has survived: "This is for swellings."

Of course we could go back further than that, if we wanted to. We now know about King Pepy I who flourished in 2750 B.C., and the big clay tablets of his reign which announced the ownership of various articles. And the

papyri of ancient Egypt carried tables of contents, and in 2698 B.C. Chinese potters were branding their wares in color.

One of those which interested us most—it is now at the Metropolitan Art Museum—said: "If you like my painting you may find me at the Bridge of Man-Chu." And then, too, we could talk for several minutes about Assyria and the heart-shaped stone tag with a hole through it. This bore the inscription: "Sheep belonging to the Shepherd Ludmahum."

Misbranding, we regret to report, arose with the increasing popularity of labels and in the Middle Ages an Elector of the Palatinate found it necessary to publish a warning that any innkeeper who sold ordinary wine labeled as Rudesheimer would be hanged.—*Am. Druggist*, Jan., 1935, pp. 14-16.

A Diphtheria Immunization Campaign in Austria*

GEORG PÖCH AND CHARLES N. LEACH

Director, Local Health Department, Eisenstadt, Austria; and International Health Division of The Rockefeller Foundation, New York, N. Y.

DURING the past 4 years Austria has suffered an unusually high incidence of diphtheria, but the case fatality rate has been extremely low. The province of Burgenland, which forms the eastern boundary of the Republic, has been particularly affected, as hospitals are few and far between, and the cost of antitoxin is in many cases prohibitive.†

In 1925 diphtheria preventive measures received a definite setback in Austria following 6 fatal accidents in Baden bei Wien.¹ The use of toxin-antitoxin was prohibited by government decree. In 1932, by authorization of the Austrian Superior Medical Council, the Bezirk Eisenstadt,‡ in the Province of Burgenland, where diphtheria was prevalent, and where no immunizations had been done, was set aside as a field where the newer methods of prophylaxis could be investigated. The primary object was to study the epidemiology of diphtheria and to demonstrate the harmlessness of formol-toxoid injections and their protective value.

The Bezirk Eisenstadt has a well organized health unit under the direction of a full-time health officer, and has served as a demonstration health unit since 1929. The staff of physicians and nurses is so organized as to facilitate follow-up work. As will be seen from Figure I, the diphtheria morbidity rate in the bezirk in 1932 was extremely high, 764 per 100,000 inhabitants. The case fatality was low, about 2.5 per cent, and there were very few severe cases. Austria as a whole shows a similar picture, with a considerable increase in the morbidity rate from 1930 to 1932, the highest since 1894.

The Burgenlanders are primarily agricultural, but their dwellings are almost entirely in closed villages. In these communities the housing conditions are in many instances as unhygienic as those in the most densely populated sections of Vienna; there is much overcrowding, and extreme poverty. The population of the Bezirk Eisenstadt according to the 1923 census was 42,010, concentrated almost entirely in 29 compact villages.

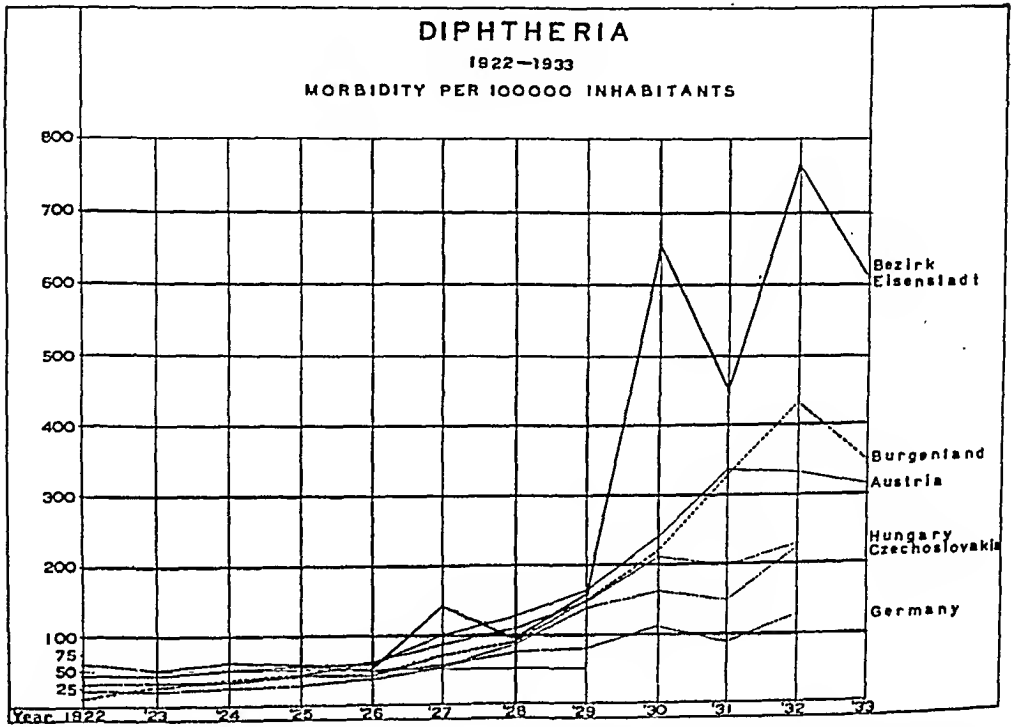
The high prevalence of diphtheria, with the disease occurring first in one village and then in another, has put a heavy financial burden on the communal governments and sickness insurance companies. There are no communicable disease hospitals in the district, and the cost of transporting the

* The studies and observations herein reported were conducted with the support and under the auspices of the International Health Division of The Rockefeller Foundation. This investigation was made possible through the consent and approval of the Volksgesundheitsamt of the Austrian Ministry of Social Welfare.

† Antitoxin retails at Sch. 3.80 (\$.70) per 1,000 unit lots. In quantities of 10,000 units it costs Sch. 35.00 (\$ 6.48).

‡ The bezirk corresponds to the American county.

FIGURE I—Comparison of the diphtheria morbidity rate for the Bezirk Eisenstadt with the rate for the Province of Burgenland and rates for Austria, Hungary, Czechoslovakia, and Germany, during the period 1922–1933



sick to those in neighboring bezirks has been considerable.

Since 70 per cent of all cases of diphtheria were being reported among chil-

dren 2 to 8 years of age, inclusive, it was decided to concentrate on this group with our program of immunization. The following plan was adopted:

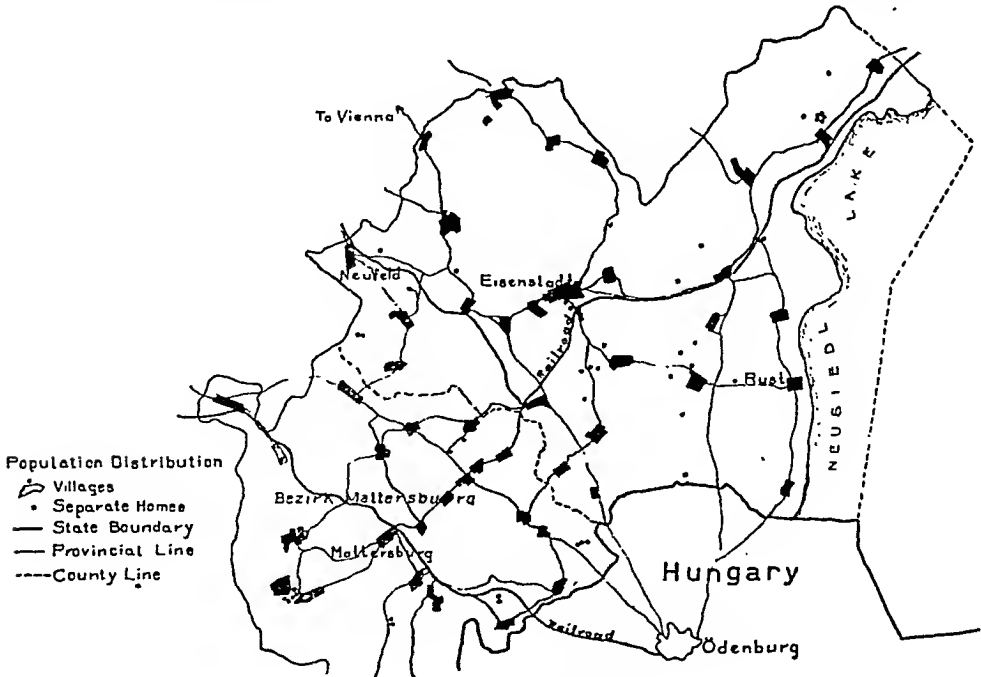


FIGURE II—Bezirk Eisenstadt

1. Perform Schick tests on, and take nose and throat cultures from, as many children as possible in the age group 2 to 8 years inclusive.

2. Read Schick tests 4 days later and administer 0.5 c.c. of formol-toxoid (8 fl. units) to each alternate Schick positive child, the remaining Schick positive children to be left as a control group.

3. Administer 1.0 c.c. of formol-toxoid 11 to 14 days after the first injection.

4. Administer 1.5 c.c. of formol-toxoid 11 to 14 days after the second injection.

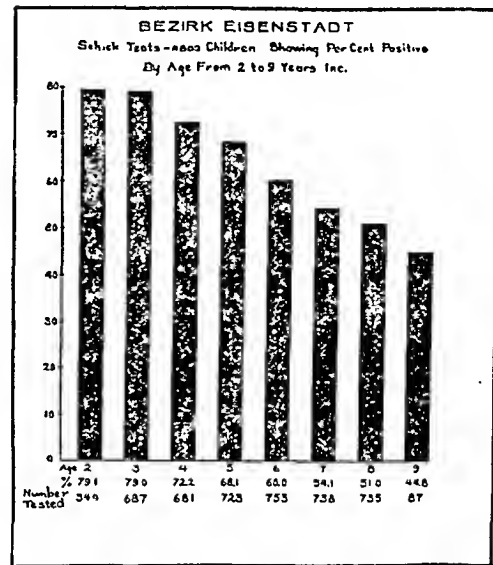
5. Make virulence tests on all diphtheria cultures obtained from carriers.

6. Perform second Schick tests on as many immunized children as possible.

7. Take blood samples (5.0 c.c.) from a certain number of children in each village at the time of the second Schick test, and titrate the serum for antitoxin content as a parallel to the Schick test.

A card index was prepared including every child in the bezirk between 2 and 8 years of age, of whom there were 5,173. Of this number 4,879 appeared for the preliminary examination. Later, 4,809 were present for the Schick reading, of whom 3,096 were found to be positive. Of the Schick positives 1,746, or 56.4 per cent, were given 3 injections (3 c.c. total) of formol-toxoid. Of 2,006 children who received the first injection 1,746, or 87.0 per cent, completed the series. This high percentage was made possible through the excellent collaboration of the population and the local health authorities. The percentage of children receiving 3

FIGURE III—Percentage of Schick positive children, by ages, among a total of 4,809 tested



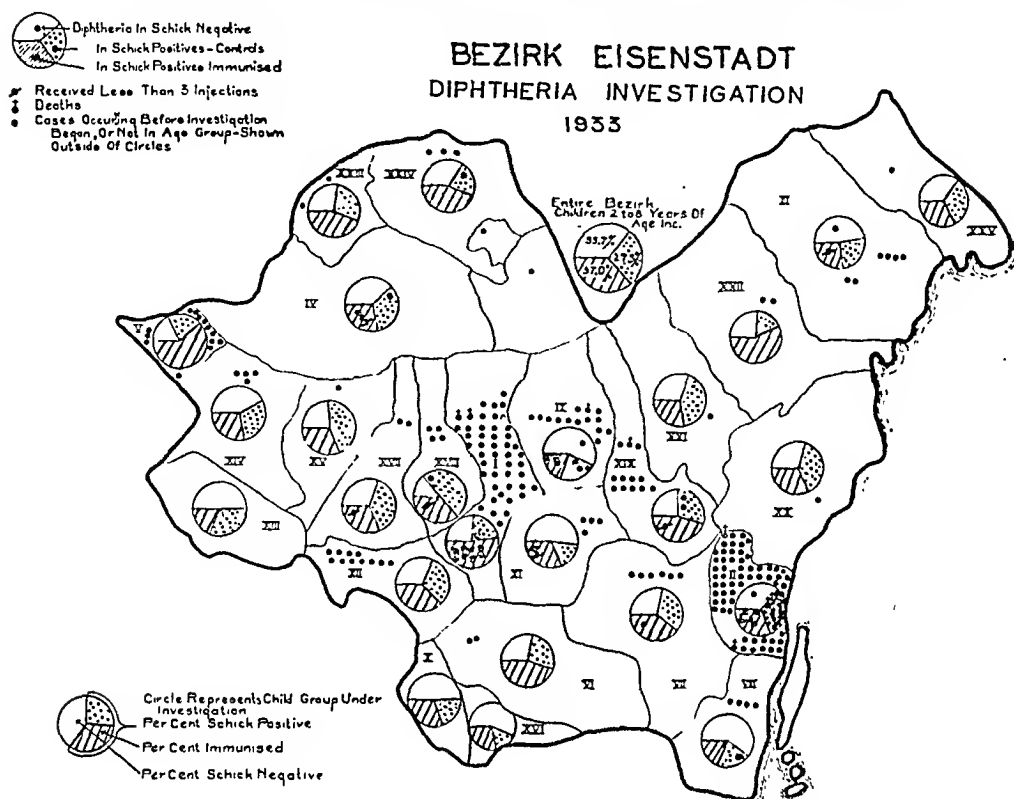
injections is generally much lower, and the efficiency of the 3 injection method is thus being markedly diminished. The campaign was inaugurated in May, 1933, and ended in August of the same year.

The toxin used for the Schick test is a product of the State Serum Institute in Vienna and complies with the international standard.² The immunizing material was formol-toxoid (8 fl. units), produced by the State Serum Institute and was supplied gratis. The formol-toxoid was injected subcutaneously over

TABLE I
REACTIONS TO FORMOL-TOXOID INJECTIONS

Age	Redness		Redness Induration Slight Fever		Redness Induration Fever	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
2	3	2.0	0	0	0	0
3	5	1.6	0	0	1	0.3
4	7	2.2	3	0.9	0	0
5	9	2.8	3	0.9	1	0.3
6	14	4.9	7	2.4	0	0
7	8	3.2	4	1.6	0	0
8	15	6.3	7	3.0	0	0
Total	61		24		2	

FIGURE IV—Incidence of diphtheria in the Bezirk Eisenstadt during the period from the beginning of the campaign, in May, 1933, to December 31, 1933



the left deltoid in 0.5 c.c., 1.0 c.c., and 1.5 c.c. amounts at intervals of 11 to 14 days. All Schick tests and readings were made by 2 young physicians who had received special preliminary training in the work at the University Kinderklinik in Vienna. No severe reactions occurred. Table I shows the frequency and severity of reactions among the group immunized.

Of the group of 1,746 children receiving 3 injections 4.6 per cent showed reactions according to the foregoing classification. The age distribution is given below.

Reactions by Ages

Age	Number	Per Cent
2	3	2.0
3	6	1.9
4	10	3.1
5	13	4.0
6	21	7.3
7	12	4.8
8	22	9.3

TABLE TO FIGURE IV

TOWNSHIP	Number of Children Tested	Per Cent	
		Schick Positive	Immunized
I Eisenstadt.....	418	73.7	52.2
II Rust.....	195	64.1	31.8
III Purbach.....	269	52.8	27.1
IV Hornstein.....	275	62.2	28.0
V Neufeld.....	240	81.3	60.0
VI Siegersdorf.....	262	72.5	45.8
VII St. Margarethen...	274	72.3	40.1
VIII Mörbisch.....	289	40.1	18.3
IX St. Georgen.....	122	43.4	19.7
X Zagersdorf.....	161	50.3	31.1
XI Trauersdorf.....	187	48.7	32.1
XII W. Prodersdorf...	244	68.9	37.7
XIII Zillingtal.....	117	50.4	18.8
XIV Stinkenbrunn.....	169	57.4	27.8
XV Müllendorf.....	100	76.0	32.0
XVI Klingenbach.....	166	44.0	27.7
XVII Gross Höflein.....	179	70.4	31.3
XVIII Klein Höflein.....	95	86.3	36.8
XIX Oslip.....	120	75.9	45.8
XX Oggau.....	211	70.6	32.2
XXI Schützen.....	140	69.3	27.9
XXII Donnerskirchen...	179	74.3	56.4
XXIII Wimpasing.....	98	72.4	44.3
XXIV Leithaprodersdorf..	131	65.6	44.3
XXV Breitenbrunn.....	168	64.5	33.3
Total.....	4809	64.3	37.0

Second Schick tests were done on 596 children in 8 villages from 10 weeks to 7 months after the third injection of

formol-toxoid. Of these, 44, or 12.6 per cent, remained Schick positive, and 552, or 87.4 per cent, were Schick negative after 3 injections.

Blood samples were taken from 213 children at the time of the second Schick test. The results of antitoxin titration as compared with Schick results will be reported later.

Complete results from the carrier survey are as yet not available. Of the 9,237 nose and throat smears examined, 124 gave positive results; and of these, 21 proved to be virulent on animal tests.

In each village every practising physician was furnished with a list of children in his community, showing results of Schick tests, those immunized, and results of second Schick tests on the latter. This served to stimulate their interest and assisted greatly in the reporting and follow-up of new cases.

TABLE TO FIGURE V

TOWNSHIP	Number of Children Tested	Per Cent	
		Schick Positive	Immunized
1 Eisenstadt.....	418	73.7	52.2
2 Rust.....	195	64.1	31.8
3 Purbach.....	269	52.8	27.1
4 Hornstein.....	275	62.2	28.0
5 Neufeld.....	240	81.3	60.0
6 Siegendorf.....	262	72.5	45.8
7 St. Margarethen.....	274	72.3	40.1
8 Mörbisch.....	289	40.1	18.3
9 St. Georgen.....	122	43.4	19.7
10 Zagersdorf.....	161	50.3	31.1
11 Trauersdorf.....	187	48.7	32.1
12 W. Prodersdorf.....	244	68.9	37.7
13 Zillingtal.....	117	50.4	18.8
14 Stinkenbrunn.....	169	57.4	27.8
15 Müllendorf.....	100	76.0	32.0
16 Kleingebach.....	166	44.0	27.7
17 Gross Höflein.....	179	70.4	31.3
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20 Oggau.....	211	70.6	32.2
21 Schützen.....	140	69.3	27.9
22 Donnerskirchen.....	179	74.3	56.4
23 Wimpassing.....	98	72.4	44.3
24 Leithaprodersdorf.....	131	65.6	44.3
25 Breitenbrunn.....	168	64.5	33.3
Total.....	4809	64.3	37.0

FIGURE V—Incidence of diphtheria in the Bezirk Eisenstadt from January 1 to May 1, 1934

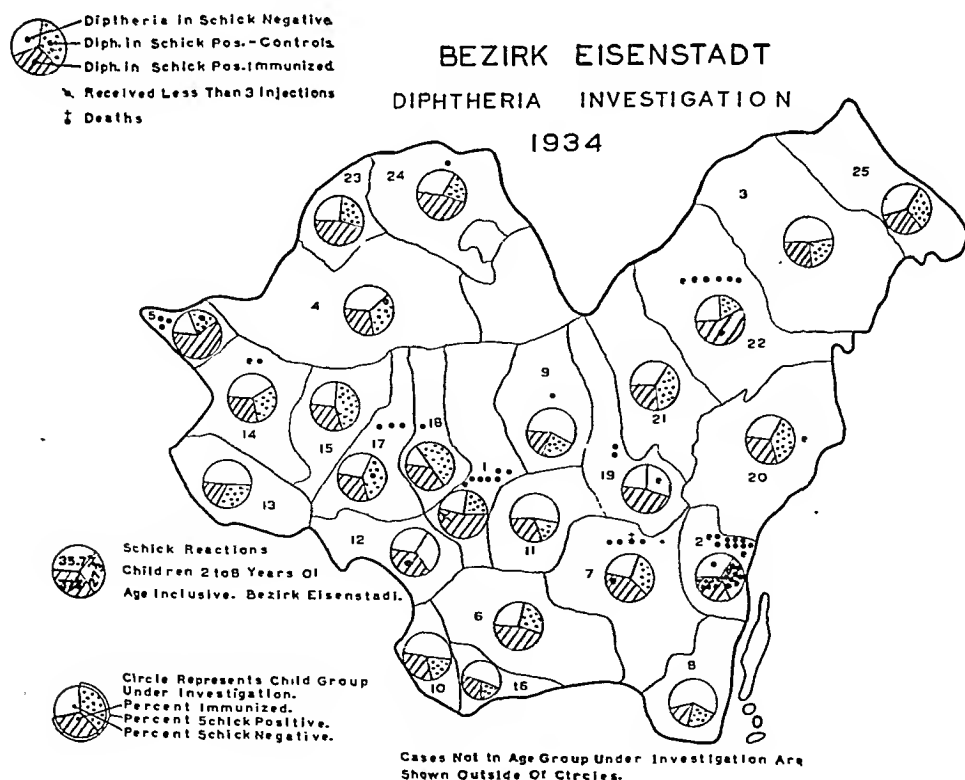


TABLE II

INTERVAL BETWEEN THIRD INJECTION OF FORMOL-TOXOID AND ONSET OF

DIPHTHERIA IN 29 CHILDREN

Case Number	Interval	Case Number	Interval
6	21 days	101	5 months
12	29 "	112	5 "
23	42 "	138	5 " 12 days
37	2 months, 25 days	169	5 " 29 "
107	3 "	134	6 " 25 "
97	3 " 6 "	188	6 "
39	3 " 15 "	146	7 "
133	3 " 28 "	150	7 "
52	4 "	177	7 "
116	4 " 2 "	181	7 " 5 days
92	4 " 5 "	182	7 " 5 "
56	4 " 6 "	183	7 " 18 "
96	4 " 7 "	192	9 " 8 "
137	4 " 8 "	194	9 " 22 "
67	4 " 10 "		

It is approximately a year since the campaign was inaugurated, and it is interesting to note the results of immunization with a formol-toxoid of low antigenic value after this length of time. Diphtheria has continued to be very prevalent. The spot maps show the occurrence of the disease, Figure IV from the beginning of the campaign in May, 1933, to the end of the year, and Figure V from January 1 to May 1, 1934.

The village of Rust (see Figure II), population 1,361, presents a particularly interesting situation. During the past 12 months 97 cases of diphtheria have occurred, of which 12, or 19.4 per cent, were in the group having 3 injections of formol-toxoid (3 c.c. total). Of the total immunized in the entire district, 29, or 1.66 per cent, contracted the disease. It is evident that, in the face of a severe epidemic, and in spite of the fact that 92.6 per cent of the children were rendered Schick negative by the 3 injections of formol-toxoid, the antigen used offered an inadequate means of protection. While 29 cases occurred among the "immunized" children, there were only 37 in the control group. All cases of diphtheria

occurring among the children who had received the 3 injections of antigen were very mild, while among the unimmunized children, 11 deaths were recorded, of which 4 were in the control group.

SUMMARY AND CONCLUSIONS

In a rural county of eastern Austria, with an unusually high incidence of diphtheria, 1,746 children 2 to 8 years of age inclusive, out of a total of 3,096 Schick positives, were given 3 injections of formol-toxoid (8 fl. units). During the year following the inauguration of the campaign, 29 cases of diphtheria occurred among those, and 4 among children giving a Schick negative reaction.

The antigen employed was apparently of too low potency to protect against diphtheria when used in the presence of an epidemic of unusual intensity. The severity of the disease was modified in those who had received 3 injections (3 c.c. total) of antigen.

REFERENCES

1. Grassberger, R. *Arch. f. Hyg.*, XCVII:97, 1926, and *Lancet*, II:1,074, 1926.
2. Report of the Permanent Commission on Biological Standardization: Series of League of Nations Publications, III. *Health*, III, 10, 1931.

Experiences With Sewage Farming in Southwest United States

Texas

V. M. EHLERS, F.A.P.H.A.

Chief Engineer, State Board of Health, Austin, Texas

CERTAINLY no more appropriate time than the present could be selected for discussing the conservation of water for irrigation, even water from sewage disposal plants, when in many sections of the country crops are suffering from drought. However, in some sections of Texas, droughts are of more or less intermittent occurrence, and part of the state is normally arid; hence, the question of placing sewage effluents on land for crop irrigation has long been of interest to Texas engineers who were searching for an economical method of disposing of a city's liquid wastes. One town has been employing land disposal for more than 20 years, another for 9 years, while still others have used the process for 7, 6, 4, and 2 years with fair results.

The disposal of sewage on land has come about gradually and naturally as streams became foul during minimum flow periods and land disposal was found to be feasible and economical. There are now 68 towns in Texas using land disposal as a secondary means of sewage disposal, and of these, 34 grow crops, and 2 use sub-surface irrigation. The chief concern of the sewage engi-

neer has been to dispose of the effluent so as to cause no nuisance, and the value of the waste water as an irrigant has later become apparent. There is a tendency at this time to give more consideration to this means of sewage disposal, as much from a desire to provide water for crop irrigation as to keep waste water out of streams. The two-fold value of the method adds interest to the problem but also makes the method of disposal more complicated and difficult of successful operation.

A résumé of the data collected by a recent survey of Texas cities reveals some interesting facts concerning this method of sewage treatment or disposal.

Some cities purchase their land, paying from \$25 to \$125 per acre, and operate the farm; others lease the city owned land to farmers who get the revenue for taking care of the sewage effluent, while still others donate the water to a farmer for his own land, supplying the effluent as the farmer needs it.

The crops most successfully grown on these sewage farms are the small grains, as maize, hegira, kaffir, and corn; the grasses, as sudan, rescue, Johnson grass, and cane; although other crops as cotton and alfalfa have been grown with profit. In addition, orchards of pecan, walnut, grape fruit, and oranges are

* Read at a Joint Session of the California Sewage Works Association and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

profiting by sewage irrigation in some sections. Small truck crops irrigated with sewage have included beans, pumpkins, potatoes, peas, and asparagus; while a few cities dispose of their excess activated sludge in the growing of roses, tulips, and other flowers.

The number of acres used by towns ranges from 1 to 3,500, while the total number of acres at present being irrigated for crops in Texas is approximately 4,500. The town using only 1 acre of land employs sub-irrigation. The City of San Antonio has for 20 years discharged its sewage effluent into Lake Mitchell, a holding reservoir, thence to approximately 3,500 acres of land which is cultivated. The average city sewage farm, however, is about 20 acres.

The cost to cities of irrigating varies from nothing, where the effluent is donated to a farmer, to \$10 per m.g., assuming no returns on the crops. In many instances the value of the crops has more than paid for the expense of keeping the farm in good condition. Cities operating their own farms have shown a revenue per acre per year of \$25 to \$135.

The minimum number of gallons of effluent applied per acre per day is shown to be 4,500, the maximum, 150,000 gal., but in the latter case the soil is sandy, regularly loosened, has good sub-drainage, and the effluent is applied only at weekly intervals. This virtually means a minimum application of 4,500 gal. per acre per day and a maximum of 25,000 gal.

All towns employing land disposal give the sewage some preliminary treatment, usually sedimentation in plain or Imhoff tanks, while several apply filtered effluents although this secondary treatment is not necessary for successful operation. It so happens that a few towns installed filters and later decided to dispose of the effluent on land. About 20 towns use land dis-

posal constantly, while some 48 depend on land disposal only intermittently, as during low stages in the receiving stream or as irrigation water is needed by the coöperating farmer or farm manager.

Land disposal of sewage effluents depends for its successful use upon local conditions such as type of soil, the amount of effluent available, cost of land, climate, and other factors.

While the majority of the towns employing this process satisfactorily are located in the arid western part of the state, a few in the southern and eastern portions have used it also with success. Two towns reported the soil too heavy in that particular locality, while one found the salt content of the effluent so high as to impair the soil for successful cropping. Four industrial institutions have found land irrigation a successful method of disposing of wastes from packing houses, cheese factories, and milk plants. The average rate of application for industrial wastes has been found to vary from 5,000 gal. per acre per day up to as high as 15,000 gal., where ideal conditions have been present. Where the land has not been overdosed, no nuisances have been reported.

As a guide to our Texas municipalities and designing engineers interested in land disposal of sewage, we have made the following suggestions:

1. Irrigation, with sewage effluents, of vegetables eaten raw will not be permitted at this time.
2. All sewage effluents disposed of on land should have pre-treatment by sedimentation, or other method, to reduce settleable solids by at least 50 per cent.
3. The use of an earthen holding tank or reservoir facilitates application of the liquor but its use is advisable only when located far enough from occupied homes to prevent odor annoyance and where proper maintenance to prevent fly and mosquito breeding nuisances is assured.
4. Adjustment of chemical treatment to avoid injury to soil bacteria and removal of

all oils and greases is necessary. Acids and alkalis in the effluent are likely to ruin the fertility of the soil.

5. Care must be exercised in applying a sewage effluent to growing crops, in order to prevent ponding and water-logging of the land. The furrow irrigation is found to be more practical than the border method.

6. Sludge disposal can be successfully effected in some instances by means similar to those employed in broad irrigation.

7. Acreage required for broad irrigation will depend primarily on the soil, both top and sub-soil which must of necessity be porous, as sand, sandy loams, etc. A study of the absorptive capacities is requisite to determination of area required.

8. A study of the water requirements of all possible crops is under way. The amount of sewage conducive to the growth of one crop may be an "over dose" to another. If utilization of the effluent for crop irrigation is not anticipated, the study will of course

be confined to natural existing vegetation.

9. With few exceptions sewage should not be applied to the fields in quantities greater than that absorbed within a period of 30 minutes. Rotation and intervals of application will vary with absorptive characteristics of the soil and the frequency of plowing. Deep plowing (12") at intervals of 6 to 12 months is recommended. Frequency of shallow plowing will be determined by surface conditions and should be practised to the extent that top soil will dry out thoroughly. Ponding should be prevented at all times to eliminate potential nuisances.

10. If crops are to be planted, reserve acreage must be provided upon which effluent can be placed during rainy weather and when crops do not require additional moisture.

11. Rainfall, evaporation, and temperature are to be taken into consideration in determining the acreage requirements for land disposal.

Cancer

CANCER research is taking a new tack, according to Dr. William J. Mayo of the famous Mayo Clinic at Rochester, Minn. This he described as an individualistic study of cancer as it occurs in different types of people according to various conditions, sexes and social customs and chronic irritation previously.

In comparison with other diseases cancer was studied and attacked as a problem of mass disease. Now, however, search is directed at ascertaining why certain people are susceptible to cancer while a far greater number are immune to it under the same conditions.—*Am. Druggist*, Jan., 1935, p. 4.

Experiences With Sewage Farming in Southwest United States*

Arizona

F. C. ROBERTS, JR.

State Sanitary Engineer, State Board of Health, Phoenix, Ariz.

IN endeavoring to present to you the sewage farming situation in Arizona, there are many items which have to be omitted due to a lack of reliable information; but with the information available, the subject will be presented as thoroughly as time permits.

When first considering this subject, the city of Tucson was studied from every angle, then by incorporating some material from the city of Casa Grande, a more complete picture is obtained of the sewage farming situation in the southern part of the State of Arizona.

This portion of the United States is most arid; this climatic feature has a tremendous influence on farming conditions.

In presenting the picture of sewage farming the cities of Tucson and Casa Grande will be generally considered from the viewpoints of operation, economics, and public health.

SEWAGE FARMING IN TUCSON

In considering this situation it is necessary to give the following pertinent facts about this city:

Population according to the 1930 census	32,506
Average yearly precipitation	11.5"

Average temperature per year	66.0° F.
Average minimum temperature	49.9° F.
Lowest recorded temperature	12.0° F.
Average maximum temperature	82.0° F.
Highest recorded temperature	112° F.
Average sewage flow	2.5 m.g.d.
Average type of sewage is domestic, with small creamery waste	
Average water consumption (1922-1933 inclusive)	4.9 m.g.d.

The city has a separate sanitary sewerage system that concentrates at the northwest corner of the city. From here the sewage flows by gravity through a 30" concrete outfall line to an inverted siphon some 3.1 miles from the city. After passing through the siphon under the river, the sewage flows through a screening chamber, then into a sedimentation chamber, with a 30-45 minute retention period, then out onto the farm. The sludge from the sedimentation chambers is concentrated and automatically pumped into a battery of 5 uncovered sludge digestors, the overflow from the digestors running back into the sedimentation chambers.

The raw sewage as it reaches the screening chamber has a hydrogen sulphide content at times of approximately 6 p.p.m., which is not surprising in view of the fact that the inverted siphon has to be cleaned from time to time due to accumulations of solids. There are places of seeding along the outfall line that produce a septic influent to

* Read at a Joint Session of the California Sewage Works Association and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

the plant. The nature of the plant with purely primary sedimentation does not improve the quality of the effluent, except to reduce the suspended and settleable solids in the amount of 79 and 95 per cent, respectively. The suspended solids average about 300 p.p.m. in the raw sewage.

The effluent as it discharges onto the farm, is therefore in a septic condition, and odors arising from the farm should not be charged to the farm, nor in the main to the uncovered condition of the digestors at the plant, but rather to the poor condition of the influent.

In the operation of the farm, there are objectionable odor conditions that arise from time to time, although recently there have been few objections by neighbors. These odor conditions may be kept to a minimum if the following precautions are observed in tilling the soil:

1. Pooling or standing of sewage in the furrows should be completely eliminated, either by plowing, cultivating, or other process.

2. Banks of ditches should not be allowed to become rank with growth so as to catch and retain the solids along the borders. This may be controlled by the use of chemicals, or by keeping the banks constantly spaded.

3. Cross-sections of irrigation ditches should be small with a maximum of depth and a minimum of width.

4. Choice of soil is an important item. A sandy loam is to be preferred to other type to preclude possibility of the soil "sealing itself off."

5. The city should operate the farm itself or have administrative power over the management to preclude the possibility of nuisance.

The city of Tucson has protected itself from odor complaints by the purchase of large tracts of land. At the present time the area of the farm comprises 1,360 acres of which they use 200 in summer to dispose of the $2\frac{1}{2}$ m.g.d., or 12,500 gal. per acre per day in the hot summer months with the high evaporation available; and 350 acres in winter to dispose of the same amount

of sewage, or 7,800 gal. per acre in the winter months.

It takes approximately 5 men, including the superintendent, to operate this farm and disposal plant adequately.

The crops that are grown in this particular climate with the yield per acre as accurately as the available information presents are:

1. Barley for hay and grain, 1 ton of threshed grain and $1\frac{1}{2}$ tons of hay per acre per crop

2. Corn for use as ensilage, $8\frac{1}{2}$ tons of ensilage per acre

3. Alfalfa for use as hay, 1 ton per acre per cutting, and 5 cuttings per year

4. Maize either as milo-maize, higuera, or federita, all used as fodder crops, 1 ton per acre

5. Sudan grass used for grazing (this practice has been discontinued)

6. Cotton, 1 bale per acre

According to a former farm superintendent, a yield of 25 to 30 per cent greater from sewage irrigated land would be expected than from other irrigated land in that particular locality. Due to the fact that this farm has not been completely leveled, the yield is approximately the same as that from adjacent farms.

A few of the economic features are presented below:

CAPITAL INVESTMENTS

Cost of the 1,360 acres for the farm	\$64,350
Cost of the disposal plant and accessories	82,600
Cost of various improvements to the farm itself	30,000
<hr/>	
Total cost of the system up to the present	\$176,950

Operational costs include all outlay, subtracting all income:

1927-1928	\$7,655.74
1928-1929	9,041.18
1929-1930	16,468.56
1930-1931	22,744.14
1931-1932	8,852.89
1932-1933	4,324.59
1933-1934	3,327.73

The years of high operational cost

were those in which ambitious programs were carried out. It has been discovered that if the farm is operated only as a means for disposing of the sewage, without attempting to produce record crops, or incidentally to compete with other farms, greater economy is effected. Crops raised are but incidental items, revenue from crops helping to offset operation expense. In addition, if this policy is carried out it does not place the city in the embarrassing position of trying to compete with private enterprise.

The public health aspects are roughly presented in the following sub-divisions:

1. Harvesting and pen-feeding, seemingly present little danger. The crops that are at present grown on this land are harvested so that they are exposed to a minimum of contamination. The hay that is cut is on a dry field. With the amount of curing and exposure to the elements it seems hardly possible that disease could arise from this source.

2. If cattle are grazed, an entirely different condition arises. To illustrate this point an example of a recent condition is submitted:

A herd of 45 cattle fattened on this farm were slaughtered and 23 were found to be infested with tapeworm (*Cysticercus bovis*), the larval stage of the tapeworm *Taenia saginata*. The cattle all bore different brands and were assumed therefore to have come from different ranges. Due to this fact, and also that this particular herd of cattle persisted in drinking effluent from the plant in preference to fresh water, it has been concluded that they were infested from this common origin.

With the exception of the draft animals grazed on this land and used by the city, it has been recommended that the practice of raising live stock on this farm be discontinued.

3. The danger from fly-borne disease is great from a farm of this kind

if the farm is not properly worked. The personnel must watch for and eliminate all places of fly breeding.

4. The danger of use of this type of broad irrigation to underground water supplies has not been thoroughly investigated, although no signs of pollution have been discovered. If the region were more populous, this might be a serious problem, but as the shallow ground water table is at a depth of at least 30', and domestic wells are located a considerable distance from the main body of the farm, it is not as important as it might be elsewhere.

SEWAGE FARMING IN CASA GRANDE

The city of Casa Grande will be compared from some viewpoints with Tucson.

The statistics necessary to obtain a picture of this community are:

Population according to the 1930 census	1,351
Average yearly precipitation	6.89"
Average yearly temperature	71.7° F.
Average minimum temperature	51.7° F.
Lowest recorded temperature	13.0° F.
Average maximum temperature	87.6° F.
Highest recorded temperature	122° F.
Average sewage flow per day	150,000 gal.
Type of sewage—domestic with small creamery wastes	
Average gross water consumption per day (1933)	238,000 gal.

There is a separate sewerage system that concentrates at the northwest corner of the city, where the sewage is treated with chlorine gas, and after treatment flows 6,300' northwest to the outfall, which is a 12" vitrified clay tile pipe.

At the point of outfall the sewage was at one time introduced into a septic tank, but due to the trouble caused by irrigation with septic sewage this was discontinued. For the past 3 years the raw sewage has been taken from the outfall and used for irrigation.

The chlorination of the sewage has been experimented with to the point that they may control odors at the

sewer farm if they dose at the rate of 6-7 p.p.m., although residual chlorine is not carried in the sewage to a man-hole 300' away from the point of chlorination. If the dosage of chlorine is increased to 10-11 p.p.m. the residual chlorine will be carried to the point of outfall.

In farming only 25 acres are required to dispose of the sewage, or 6,000 gal. per acre. The city owns 40 acres of this sandy loam, but have not been obliged to use more than the 25. The small acreage required is due principally to the control of odors through chlorination.

The only crop raised is cotton. The yield is usually 2 bales per acre, as compared to 1 bale per acre on the best adjacent farms.

The city does not farm this land itself, but leases it at a rate of \$90 for 3 years. The cost of chlorination is \$.50 per day, or \$183 per year, dosing at the rate of 6-7 p.p.m. Therefore, the cost to the city is \$153 per year plus supervision to dispose of the 150,000 gal. per day flow.

It takes but 1 man, furnished by the lessee, to take care of this amount of sewage on this 25 acre tract. The provision made in the city's contract is

that only those crops approved by the city government will be grown. The city therefore has an administrative power over the land.

CONCLUSION

In conclusion, it would seem that a combination of these two methods of sewage farming would be satisfactory in this climate providing that industrial wastes do not complicate the problem. With the ordinary domestic wastes, the system of prechlorination with a long contact period, to aid in sterilization, and to enable the sewage to reach the land in a fresh condition, coupled with screening and primary sedimentation to relieve the land of some of the load placed on it, would prove economical and satisfactory from every viewpoint, in the system of sewage farming as developed by these two cities.

NOTE: Appreciation is extended to the following individuals in their coöperation and efforts in discovering information on this subject:

George W. Marx, Sanitary Engineer, City of Tucson

R. C. Butler, City Manager, City of Tucson

C. E. Pecquignot, Auditor, City of Tucson

M. E. Watson, Farm Superintendent, 1930-1932, City of Tucson

Mr. Norman, City Engineer, City of Casa Grande

Tribute to Bailey K. Ashford

FROM Puerto Rico comes word of an affectionate tribute paid to the memory of Dr. Bailey K. Ashford, whose autobiography, *A Soldier in Science*, was published recently by Morrow.

In the hall of the School of Tropical Medicine, at San Juan, stands the bust of Dr. Ashford. Since his death a few weeks ago the early morning arrivals at the school have found the statue banked with flowers, many in strange

little native jars. A watchman was appointed to see who the donors were. In the middle of the night several Puerto Rican women, dressed in shabby black and heavily veiled, stole in, their arms filled with flowers. It was evident that they were poor people who had walked many miles from the heart of the hills to pay a last tribute to the doctor who had saved them or their children from the scourge of hookworm. —*N.Y. Times Book Rev.*, Dec. 30, 1934.

Experience With Sewage Farming in Southwest United States*

California

E. A. REINKE

*Senior Sanitary Engineer, Bureau of Sanitary Engineering,
State Department of Public Health, Berkeley, Calif.*

IRRIGATION of crops with sewage has been practised in California for many years. Pasadena's sewer farm was purchased in 1887 and is probably the oldest in the state.

Early methods of handling sewage were crude. Few treatment plants were in use and there was little or no restriction on crops raised. The tendency then, as now, was to derive the greatest possible revenue from the farm, and regard for sewage disposal was secondary. It naturally followed that dissatisfaction arose; neighbors complained of odors; flooding of adjoining property; and fly and mosquito breeding. In 1900 to 1910, many septic tanks were constructed, hoping to overcome the objections; but experience with them was disappointing. Imhoff tanks came on shortly after and gave some improvement. In recent years, both Imhoff tanks and separate sludge digestion plants have been used for preliminary treatment and the trend has been to adopt trickling filters and activated sludge plants for oxidation works, prior to irrigation.

There was a steady increase in use

of sewage for irrigation during the 30 year period from 1890 to 1920. The peak was reached about 1923 when some 70 municipalities disposed of all or part of their sewage by irrigation of crops. Accurate data are not available for the period before 1920, but since that year, 15 places have started irrigation with sewage and 30 others have abandoned the practice. Those abandoning sewage farming have, in the majority of cases, gone into joint outfall sewers, spread the sewage on land without cropping, or constructed new disposal works. At the present time, sewage from 53 municipalities is being disposed of by irrigation of cultivated crops, from 9 others by irrigation of wild crops, and from another 28 on land with no crops.

Thus 90 out of a total of 310 municipalities in California having sewer systems, now have land disposal.

A survey of use of sewage for irrigation in California was made by the Bureau of Sanitary Engineering in 1933. At that time 62 cities reported use of sewage on land, and 46 went in for some kind of cropping, watering a total of 4,050 acres. Of this, 3,628 acres were under cultivation, the remainder being wild grass. The acreage of various crops irrigated with sewage effluent included 340 acres of vegetables (all of

* Read at a Joint Session of the California Sewage Works Association and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

varieties that are eaten cooked); 150 acres of dry beans, 63 acres of tomatoes, and 1,660 acres of fruit trees and vineyard. The remaining 1,617 acres were planted to alfalfa, fodder crops, sugar beets, hops and cotton.

In 1918 the California State Board of Health adopted regulations concerning use of sewage effluents for irrigation, which prohibited irrigation of berries and salad vegetables; permitted irrigation of vegetables harvested in the dry state; and permitted, under restrictions, such uses as (1) for garden truck if not watered 1 month before harvesting; (2) orchards, if windfalls were not gathered for human consumption; (3) melons if raised on hills above the water; and (4) fodder crops if milk cows were excluded from the fields.

Under the regulations, health officials were obviously required to supervise the growers and the regulations proved unsatisfactory.

In recent years, with increasing population, shrinkage of water supplies and improved methods of sewage treatment, several groups urged wider use of sewage effluents for irrigation which could not be done under the then existing regulations.

Under all the circumstances a revision of the regulations seemed advisable, and after a series of conferences with health officers and sewage disposal experts, new regulations were decided upon and adopted in May, 1933, based on classification of sewage effluents as well as on crops to be irrigated.

The aim was to minimize the supervision of the growers by health departments and, instead, to concentrate efforts on operation of the sewage treatment plants and the character of effluent produced.

In brief, the present rules forbid the use of raw sewage and raw or undigested sludge for irrigation of growing crops; make no restrictions on use of well oxidized, highly disinfected effluents; and permit the use of settled and undisinfected effluents on nursery and fodder crops, cotton and sugar beets but not on vegetables, berries and low-growing fruits.

Since sewage irrigation is considered an integral part of sewage disposal, the intention is that its regulation in California be handled under the permit features of the Public Health Act. This Act governs all forms of sewage disposal.

Treatment and Disposal of Sewage in the National Parks*

H. B. HOMMON, F.A.P.H.A.

Sanitary Engineer, U.S. Public Health Service, in Charge Sanitation in National Parks in the Western Division of the National Park Service, San Francisco, Calif.

SINCE 1922, sanitary engineers of the U. S. Public Health Service have been detailed to the National Park Service to assist superintendents of national parks, custodians of national monuments, and engineers of the Park Service on problems of sanitation in the parks and at monuments. The work of the sanitary engineers has included surveys and reports of investigations of water supplies, sewerage and sewage disposal, garbage disposal, swimming pools, mosquito control, and general inspections of all places handling and serving food products. In addition, plans have been prepared for water supply systems, sewage treatment plants, and garbage incinerators.

The sewage treatment plants discussed in this paper have been constructed in the parks in the Western Division of the National Park Service. In this division, which includes the National Parks west of the Mississippi River, except Hot Springs National Park, Arkansas, there are 19 parks located as follows: 1 in Alaska, 1 in Arizona, 4 in California, 2 in Colorado, 1 in the Hawaiian Islands, 1 in Montana, 1 in New Mexico, 1 in Oregon,

1 in Oklahoma, 1 in South Dakota, 2 in Utah, 1 in Washington, and 2 in Wyoming. All, except Hawaii, are located in sections or at elevations where there are more or less severe winters. Some are practically inaccessible in winter, others are visited by parties on snow shoes or skis, and 10, which include Carlsbad Caverns, General Grant, Grand Canyon (South Rim), Hawaii, Mount Rainier, Platt, Rocky Mountain, Sequoia, Yosemite, and Zion, are open to tourists by train or automobile throughout the year.

In 1933, the number of visitors was 2,013,024. The maximum number visiting one park was 296,088 at Yosemite, and the smallest, 368, at Mount McKinley. The parks having over 100,000 visitors were: Yosemite, 296,088; Rocky Mountain, 291,934; Hawaii, 237,690; Platt, 220,606; Mount Rainier, 170,104; Yellowstone, 161,938; Sequoia, 126,464; and Grand Canyon, 105,475. There is in addition to the visitors a permanent population which varies from a few in the smaller and less patronized parks to approximately 1,500 in Yellowstone.

The accommodations for visitors in the parks are hotels, lodges, house-keeping cabins, and automobile camp grounds, and for the permanent population residences and dormitories. The locations of these accommodations in

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the various parks vary widely. At the South Rim of the Grand Canyon practically all the visitors and employees live in one area, whereas in Yellowstone there is 1 area with all the accommodations listed above, 4 with all the accommodations except residences, 2 other places with lodges, housekeeping cabins, and large camp grounds, and several other smaller areas having automobile camps. The maximum number of people in one area in a park was 23,000 in Yosemite Valley on July 4, 1932. In Yellowstone there are 6 areas where the total population will vary from 100 to 2,500 people, and other places, mostly automobile camps, where the number of tourists will range from 25 to 100. In Yosemite Valley there were at one time 9,000 visitors living in tents in tourist camps, and in Yellowstone 800 in each of 2 camps.

There are in the western parks, 65 areas having for visitors extensive accommodations which are generally grouped together and served by a common water supply system, sewerage system and disposal plant, garbage incinerator, and other public utilities.

There have been constructed 52 sewage treatment plants since 1922. In designing these plants the important considerations were: (1) protection of streams against contamination and in one park reclamation of sewage for industrial purposes; (2) prevention of odor nuisances; and (3) maintaining architectural and landscape values. The treatment plants constructed include (a) activated sludge, rapid sand filter and disinfection; (b) activated sludge and disinfection; (c) settling tanks and disinfection; (d) settling tanks and spraying systems which distribute settled sewage, with and without disinfection, over natural ground surfaces, usually hillsides of porous material; (e) settling tanks and sub-surface galleries with concrete, wood, or metal walls and covers; (f) settling tank and glass-

covered sand filter; (g) settling tanks and open trenches; and (h) settling tanks, broad irrigation, ponds and disinfection. Following are descriptions of a representative plant of each of the types listed above.

ACTIVATED SLUDGE, RAPID SAND FILTER AND DISINFECTION

The cost of hauling water to the South Rim of the Grand Canyon National Park in tank cars and delivering it in service lines, prior to 1932 was \$3.07 per 1,000 gallons and approximately \$2.50 for pumping and delivery since that date. In order to reduce the volume of water hauled, a pressure sand filter was added in 1913 to an existing sewage treatment plant, consisting of septic tank and contact filter, to produce an effluent which could be used in place of fresh water for irrigation of lawns and making steam. For a few years following 1913 the effluent was apparently satisfactory for the purposes noted, but with an increasing volume of sewage the plant became badly overloaded, a serious odor nuisance developed, and the effluent could not be used on lawns because of the odors, or in boilers due to foaming.

It was decided in 1926 to build a new sewage treatment plant to produce an effluent which could be used for industrial purposes and be distributed in a separate piping system properly protected against cross-connections, without being a serious health hazard to the visitors and people living at the South Rim.

A treatment plant consisting of settling tank, slow sand filters, and disinfection seemed to have the most inherent advantages from the standpoint of high removal of bacteria and quality of effluent in general, and low cost of operation and maintenance, but it was impracticable to build this type of plant on account of the high cost of sand delivered to the South Rim. The

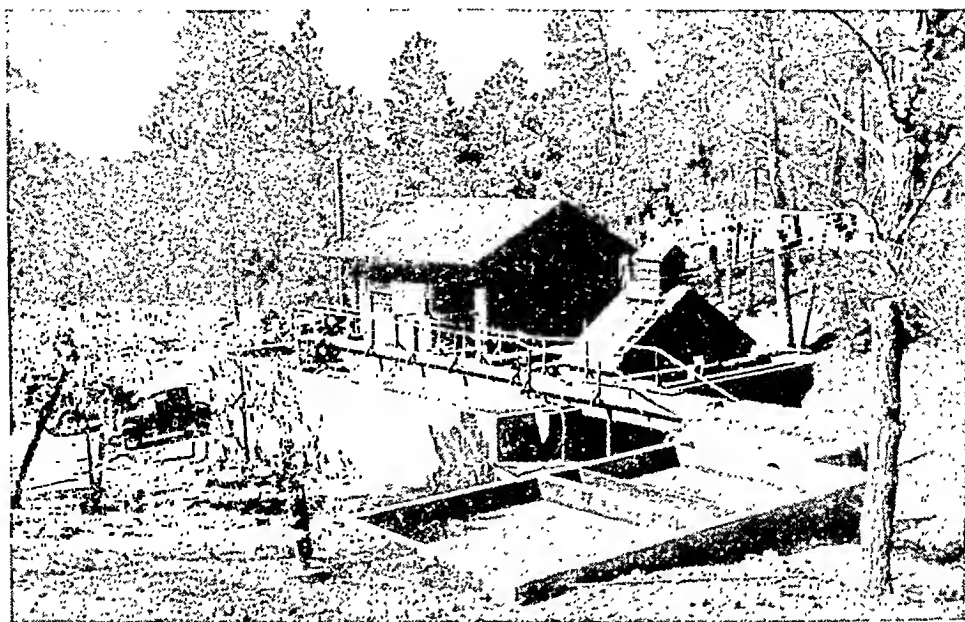


FIGURE I—Sewage Treatment Plant, Grand Canyon National Park

treatment plant designed included activated sludge, rapid sand filters, and disinfection.^{1, 2} The local conditions, other than those pertaining to the industrial uses of the reclaimed sewage, which had to be given consideration in the design of the treatment plant, were the variations in the temperature of the raw sewage, from 92° F. in summer to 72° F. in winter, and the treatment of the laundry wastes, which constitute approximately 10 per cent of the total volume. Figure I shows a general view of the treatment plant.

The available data indicated that the maximum volume of sewage produced at the Canyon during 1926 was 100,000 gal. per day, and the treatment plant was designed to treat 200,000 gal. The following devices were included in the plant:

Screen—The screen is 3' wide by 3' deep and has $\frac{3}{8}$ " by 2" rectangular iron bars spaced $2\frac{3}{8}$ " on centers.

Pre-settling tank—This tank is 16' by 8', with an effective depth of 5' to the top of the two hoppers which are 4' deep. The theoretical detention period is 30 minutes for a maximum

volume of 200,000 gal. of sewage per day.

Diversion chamber—This is a small tank located on the pipe line from the pre-settling tank to the aeration tanks. It receives the activated sludge returned from the clarifier to the aeration tanks and can be used for by-passing the sewage around the plant.

Aeration tanks—There are two of these tanks, each 42' by 8' by 10' deep below the water level. They were designed for an average aeration period of 6 hours.

In each tank there are two continuous concrete channels each 42' long and having at the top porous plates which rest on T-irons across the channels and in recesses along the sides of the channels, and which are held in place by cement grout. There are concrete ridges between the channels. The air is pumped through 4" pipes to one end of the channels, and at the opposite end there are 4" outlet pipes which permit flushing of the channels and cleaning the under surfaces of the porous plates with water or steam. The tanks were designed so that they can

be operated in series or separately.

Clarifier—This tank is 16' square with an effective depth of 11½'. It has a settling rate of practically 800 gal. per sq. ft. per day, and a theoretical detention period of 2 hours when sewage is flowing through at a rate of 200,000 gal. per 24 hours. The influent enters the tank through 4 openings spaced equidistant along one side and 1' below the water surface, and the effluent flows over a brass weir the full width of the tank. There are inlet and outlet baffles extending 3' below the water level. The activated sludge moved by the scrapers of the clarifier to the center of the tank is returned to the aeration tanks by an air lift.

Coagulation tank—This tank, originally designed as a coagulation basin to be used in connection with operation of the rapid sand filter, is 16' by 4' by 10' deep. Up to the present time, the filters have operated satisfactorily

without the use of coagulants and this tank has been used as a secondary settling tank.

Rapid sand filters—There are 2 of these filters each having an area of 77 sq. ft. The wash-water troughs are of concrete and the underdrainage consists of 12" headers with 1¼" cast iron laterals having ¼" holes bored on 3" centers. Each filter has 20" of graded gravel and 32" of sand with an effective size of 0.40 mm. and a uniformity coefficient of 1.6. Reclaimed sewage, disinfected, is used for washing the filters.

Disinfecting equipment—Duplicate semi-automatic chlorine machines are used for disinfecting the effluent from the sand filters.

Blowers—Two blowers each with a capacity of 225 cu. ft. of free air per minute against 6½ lb. pressure per sq. in. at an altitude of 6,500', supply the aeration tanks and air lift with air.

TABLE I
B. COLI IN RECLAIMED SEWAGE, GRAND CANYON NATIONAL PARK

Year	Source	No. samples tested for B. coli	No. samples having 3 or more 10 c.c. portions positive	Per cent samples having 3 or more 10 c.c. portions positive	No. 10 c.c. portions tested for B. coli	No. 10 c.c. portions positive	Per cent 10 c.c. portions positive
1929	Storage tank *	40	0	0	225	13	5.8
	Power house †	39	0	0	218	10	4.6
	Total	79	0	0	443	23	5.2
1930	Storage tank	87	1	1.2	435	21	4.8
	Power house	90	0	0	450	29	6.4
	Total	177	1	0.56	885	50	5.6
1931	Storage tank	54	0	0	270	15	5.5
	Power house	60	1	1.7	300	19	6.3
	Total	114	1	0.88	570	34	5.9
1932	Storage tank	73	0	0	365	21	5.8
	Power house	47	0	0	235	8	3.4
	Total	120	0	0	600	29	4.8
1933	Storage tank	40	1	2.5	200	10	5.0

* Tank located 1½ miles from treatment plant and has capacity of 200,000 gal.

† Samples collected from make-up tank which receives reclaimed sewage from storage tank.

TABLE II
CHEMICAL ANALYSES OF RAW AND RECLAIMED SEWAGE
GRAND CANYON NATIONAL PARK

Month 1933 1934	Suspended matter p.p.m.		Settleable solid c.c. per liter 1 hour		Dissolved oxygen p.p.m.		Oxygen demand p.p.m.		Soap hardness p.p.m.		Hydrogen ion concentration	
	R	C.W.	R	C	C.W.	P. H.	C	C.W.	R	C.W.	R	C
January	104	10.0	8	0.3	7.3	8.2	6.8	1.8	21.0	14.8	7.6	7.2
February	74	10.0	6	0.25	7.4	8.5	7.3	1.6	25.0	16.6	7.5	7.2
March	111	9.0	9	0.24	7.3	8.3	7.2	1.3	21.7	17.7	7.5	7.1
April	91	10.0	7	0.28	7.0	8.0	6.8	1.3	21.3	19.2	7.5	7.2
May	103	11.0	8	0.29	6.7	7.3	6.3	1.6	20.0	20.8	7.5	7.2
June	163	9.0	10	0.24	5.6	6.0	5.3	1.3	22.7	15.9	7.6	7.2
July	105	11.0	8	0.3	4.5	5.2	4.3	2.5	20.9	17.5	7.6	7.2
August	120	12.0	10	0.3	4.4	5.0	3.8	1.3	23.2	18.4	7.5	7.3
September	105	8.0	8.2	0.2	4.6	5.8	4.4	1.0	19.0	16.5	7.5	7.3
October	86	11.0	7	0.27	5.2	5.7	4.9	2.0	17.3	16.0	7.5	7.3
November	93	9.0	7	0.2	5.0	5.5	4.6	1.7	19.0	14.2	7.5	7.2
December	90	10.0	7	0.27	5.2	5.8	5.0	1.3	20.8	19.1	7.5	7.2
January	88	10.0	7	0.26	5.3	5.6	5.1	1.1	20.9	16.0	7.5	7.2
February	101	10.6	8.3	0.31	5.3	5.5	5.1	1.6	20.5	17.0	7.5	7.3
March	89	9.7	7.4	0.24	5.3	5.8	4.1	2.5	22.8	14.0	7.6	7.3
April	94	11.2	7.8	0.28	4.2	4.9	4.2	2.6	21.5	15.3	7.6	7.2
May	92	9.6	7.6	0.24	4.6	5.2	4.6	2.2	20.5	19.2	7.7	7.1
June	97	12.5	8.1	0.2	3.6	4.3	3.6	2.9	22.6	21.1	7.6	7.2
July	88	14.0	7.4	0.35	2.7	3.2	2.6	1.8	23.8	20.3	7.6	7.2

Note R—Raw sewage.

C—Effluent clarifier.

C.W.—Clear well.

P. H.—Tap at make-up tank in power house.

Wash-water storage tank—This tank, which is used to store the wash water from the filters, is 25' long by 16' wide and 4½' deep below the overflow. A small centrifugal pump returns the wash water to the pre-settling tank.

Pumping equipment—The final effluent from the plant is pumped through 1½ miles of 4" pipe to a 200,000 gal. elevated tank by two 3-stage centrifugal pumps.

In Tables I, II, and III are given, respectively, the *B. coli* density in the reclaimed sewage for the years 1929 to 1933 inclusive, the monthly averages of chemical analyses, and data pertaining to the operation of the treatment plant for 1933 and up to August, 1934.

Handling reclaimed sewage—All the pipe lines carrying reclaimed sewage are enclosed in vitrified pipe and all pipes in buildings or above ground are painted red, and over every service outlet there is a sign warning against drinking the water. The tank in which the reclaimed sewage is stored is 125' lower than the tank used for domestic water. Accurate maps of the 2 water systems are kept up to date. Beginning in October this year a dye solution strong enough to give a color to the reclaimed sewage will be added once

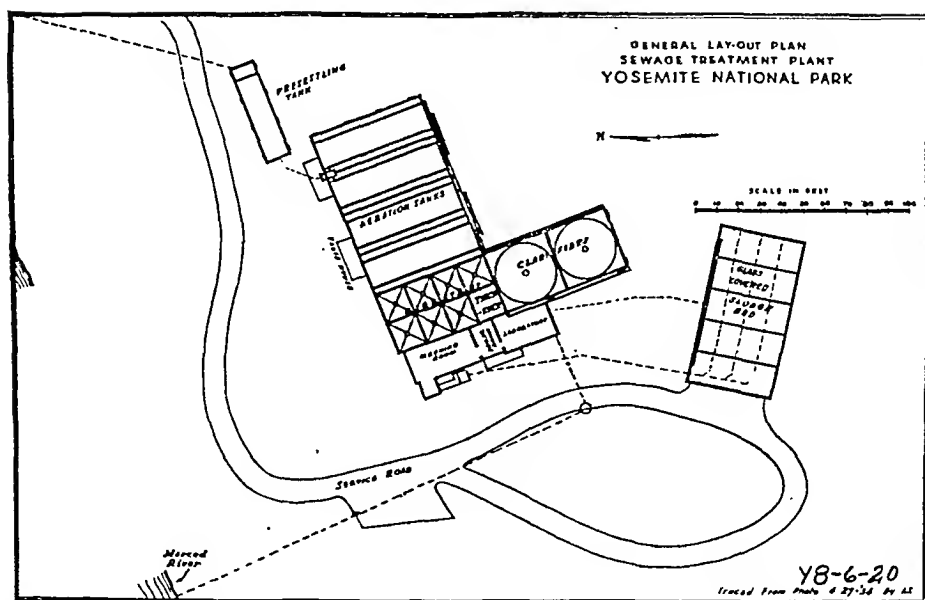


FIGURE II—Sewage Treatment Plant, Yosemite National Park

a month to the effluent at the treatment plant.

Uses of reclaimed sewage—The reclaimed sewage is used in locomotive boilers, boilers for heating purposes, for watering lawns and flowers at the El Tovar Hotel, for flushing toilets in public comfort stations, washing automobiles, cooling water in jackets of Diesel engines, and in pipes used for drying garbage in an incinerator.

Cost of reclaiming sewage—The cost of operating the treatment plant, exclusive of interest and depreciation, but including pumping the reclaimed sewage to the storage tank, averages approximately \$0.38 per 1,000 gal.

ACTIVATED SLUDGE AND DISINFECTION

In 1930 there was constructed in Yosemite Valley, in Yosemite National Park, an activated sludge plant^{3, 4} to replace an Imhoff tank and natural sand filters which were badly overloaded and producing offensive odors. Yosemite Valley, at the only place where a new sewage treatment plant could be located, is approximately 1 mile in width with vertical walls about 3,000' in height, and there are two

highways, one on each side of the river which flows through the valley. On account of the odor nuisance and bad appearance of the old treatment plant, and the unfavorable topography of the floor of the valley, with regard to suitable sites for a new plant, local sentiment in the valley was doubtful that any type of treatment plant would operate without some kind of nuisance. The stringent requirements which the new plant had to meet were (a) that there would be no odors, (b) that the plant could not be seen from the highways on the floor of the valley or on slopes leading out of the valley, (c) that there would be no noise, (d) that the Merced River, which is used as a source of domestic water supply, would not be contaminated, and (e) that fish in the river would not be killed by chlorine in the effluent.

The treatment plant was designed for a maximum of 1,200,000 gal. of sewage daily, which was approximately twice the maximum flow up to 1930. Practically all of the sewage is pumped to the plant at a rate of 850 gal. per minute, which, while the pumps are operating, gives a rate of flow of 1,200,000 gal.

TABLE III
OPERATING DATA SEWAGE TREATMENT PLANT, GRAND CANYON NATIONAL PARK
(Figures represent monthly averages of daily records)

Month 1933 1934	Sewage flow 1,000 gallons daily	Reclaimed sewage 1,000 gallons daily	Temp. deg. F.		Sludge wasted 1,000 gallons		Aeration tanks			Sand filters		Chlorine		
							Per cent sludge in tanks	Aeration hours	Cubic feet* air used per gal.	Rate† filtration m.g.d.	Per cent wash water	lbs.	p.p.m.	Resid. p.p.m.
			Raw	Effl.	Raw	Active								
January	76	75	70	62	0.6	0.2	23	10.2	4.0	23	6.7	2.7	5.6	0.8
February	68	67	70	61	0.6	0.3	25	10.3	4.4	21	7.4	3.1	6.0	0.8
March	69	68	76	66	0.6	0.3	24	10	4.3	21	7.3	3.7	6.7	0.8
April	93	92	78	66	0.6	0.3	22	10	3.3	28	5.6	3.6	6.0	0.8
May	102	101	80	67	0.6	0.5	25	9.2	3.0	31	5.1	4.1	4.8	0.8
June	103	102	74	82	0.6	0.6	25	8.9	3.0	31	5.0	3.8	4.5	1.0
July	105	104	86	78	0.6	0.4	24	8.8	2.9	32	6.2	4.6	6.0	0.8
August	112	103	84	78	0.6	0.8	25	8.7	2.7	34	5.8	5.5	5.9	0.8
September	108	107	84	77	0.6	0.6	25	8.5	2.8	33	6.3	4.6	6.1	0.8
October	103	102	82	75	0.6	0.7	26	8.9	2.9	31	6.8	4.8	6.4	0.8
November	96	94	79	71	0.6	0.6	24	9.6	3.1	29	6.5	4.5	4.6	0.8
December	99	97	75	68	0.6	0.5	25	9.2	3.1	30	6.5	4.5	4.6	0.8
January	95	92	68	75	0.6	0.4	24	10	3.2	29	6.8	4.6	5.5	0.8
February	96	92	84	72	0.6	0.7	25	9.9	3.3	29	6.8	5.3	6.5	0.8
March	101	100	72	79	0.6	0.8	21	9.7	3.3	31	6.4	4.9	7.7	0.7
April	109	107	85	77	0.6	1.2	20	8.1	2.8	33	5.9	7.4	6.9	.44
May	105	103	86	78	0.6	1.6	26	8.7	2.9	32	6.2	5.2	5.1	.52
June	112	110	89	80	0.6	1.0	27	8.2	2.7	34	5.8	5.6	6.4	.43
July	110	109	93	86	0.6	0.8	27	8.3	2.8	33	5.9	6.1	6.7	.46

* Air supplied at a uniform rate of 225 c. f. m. No deduction for air lift.

† Average rates; maximum rates are approximately twice the averages.

through the plant. The general layout of the plant is shown in Figure II.

The plant has the following treatment devices and equipment:

Coarse screens — The screen chamber, which is 7½' by 5' by 2' deep below the outlet, has two bar screens, one with 2" and the other with 3" openings. The screens were designed primarily to remove coarse material which might clog the 12" siphon which begins at the screen chamber and extends under the river to the pre-settling tank.

Pre-settling tank — This tank is 40' by 10' by 16' deep to the bottom of the hoppers, and has a concrete cover. The theoretical detention period is 45 minutes when treating 850 gal. per minute, the capacity of the pump normally used to lift the sewage to the gravity line to the treatment plant. There is a baffle at the inlet but only a skimming weir at the outlet. The sludge is drawn from the hoppers to the thickening tank daily during the period of maximum travel to the park.

Aeration tanks — There are 4 aeration tanks of the Manchester type, each 50' by 18½' and 12' effective depth. There are in each tank, two rows of porous

TABLE IV

B. COLI IN EFFLUENT OF SEWAGE TREATMENT PLANT
AND IN MERCED RIVER ABOVE AND BELOW OUTLET OF PLANT, YOSEMITE NATIONAL PARK
PERIOD—JANUARY 1, 1932, TO AUGUST 4, 1934

SOURCE	Number of 10 c.c. portions tested for B. coli			Per cent 10 c.c. portions positive for B. coli			Number of 1 c.c. portions tested for B. coli			Per cent 1 c.c. portions positive for B. coli		
	1932	1933	1934	1932	1933	1934	1932	1933	1934	1932	1933	1934
Merced River 2 miles above treatment plant	251	186	155	63	38	17	39	50	31	36	34	6.5
Merced River 1 mile below treatment plant	263	192	155	62	40	22	38	52	31	37	30	13
Merced River * at park boundary	254	191	155	50	40	25	38	52	31	18	23	9.7
Effluent † treatment plant 8:30 A.M.	259	260	150	20	2.3	2.7	36	52	30	14	1.9	0.0
Effluent † treatment plant 10:00 A.M.	258	249	140	23	2.4	2.8	36	51	28	17	0.0	0.0
Effluent † treatment plant 11:30 A.M.	238	249	140	23	2.0	5.0	31	50	28	19	0.0	0.0

* Approximately 8.5 miles below treatment plant.

† After disinfection.

plates set over continuous channels extending the length of the tanks. The plates were set in recesses along the sides of the channels and on flat aluminum bars across the channels. Cement grout was used to hold the plates in place and make airtight joints. Air is applied at one end of the channels and at the opposite ends there are outlets for flushing them and washing the under surfaces of the plates. Tanks 1 and 2 are arranged for operation as single units, in series or in parallel, and tanks

3 and 4 in series with 1 and 2. The tanks were designed for a theoretical aeration period of $5\frac{1}{2}$ hours with 20 per cent activated sludge.

Final clarifiers—The two clarifiers, each 28' square at the top and with circular bottoms, have 11' and 10' effective depths, respectively, and are operated in series. Each tank was designed for a settling rate of 1,600 gal. sewage per sq. ft. per day and has an inlet baffle $5\frac{1}{2}'$ deep. Sludge is drawn by air lifts from the first unit to the



FIGURE III—Yosemite National Park Sewage Treatment Plant Showing Machinery Room, Laboratory and Office Building and Glass Covered Sludge Bed

aeration tanks and from the second unit to the pre-settling tank. Liquid chlorine is applied to the influent to the second clarifier by full automatic chlorinators in duplicate.

Thickening tank—This tank is 12' by 13' by 13' deep to the hopper bottom. Sludge is discharged into this tank by gravity from the pre-settling tank and the first clarifier. The concentrated sludge is pumped to the digestion tanks and the decanted liquor to the pre-settling tank.

Digestion tanks—There are 4 covered sludge digestion tanks, 3 of which are 28' by 12' by 18½' deep to the bottom of the hoppers, and the fourth, 13' by 12' by 18½'. There are concrete domes for collecting gas, coils around the walls for heating the sludge, and a pump for delivering sludge to the tanks and for circulating the sludge. Digested sludge flows by gravity to the sludge drying bed.

Sludge drying beds—The glass covered sludge drying bed is divided into 5 sections, each 15' by 40' and has

1' of river sand with underdrainage connected to a pipe line leading to a pump sump.

Drainage sump—The waste liquors from the digestion and thickening tank, drainage from sludge beds, the wastes from laboratory and toilets, and all other liquid wastes from the plant, other than the disinfected effluent, are discharged into the drainage sump and pumped to the pre-settling tank.

Blowers—There are two centrifugal blowers, each with a capacity of 425 cu. ft. free air per minute against a head of 7 lb. at an elevation of 3,000'.

Operation of treatment plant—The plant is under the direct supervision of two operators between 8 A.M. and 2 A.M., with no one at the plant from 2 A.M. to 8 A.M. In addition to operating the plant, the operators inspect and keep in working order the ventilating apparatus at the Wawona Tunnel, and one of the operators makes the chemical analyses of sewage and bacteriological analyses of samples from the effluent of the plant, and water and

milk collected at various places in the park. Three samples of the effluent and 3 from the Merced River above and below the outlet of the plant are shipped to the U. S. Public Health Service Laboratory in San Francisco each week for bacteriological analysis. The treatment plant has been in continuous operation since August, 1931, and except for bulking of sludge in the aeration tanks at infrequent intervals, and minor troubles with the mechanical equipment, it has operated in a highly satisfactory manner. Figure III shows the laboratory and office building and glass covered sludge bed. Table IV gives the density of *B. coli* in the effluent of the treatment plant and in the Merced River above and below the outlet from the plant to the river.

On account of the many duties each operator has to perform at the treatment plant during his shift, it is necessary to limit the chemical analyses to those essential to the operation of the plant and to a knowledge of the character of the effluent discharged to the river. Table V gives operating data and the chemical analyses, except the suspended matter in the raw sewage which is determined only occasionally in composite samples collected on Sunday, which is the day of the week ordinarily with the heaviest travel to the park. The suspended matter in the sewage produced on Sundays averages between 100 and 125 p.p.m.

SETTLING TANKS AND DISINFECTION

Settling tanks with disinfection of the effluent, have been used for treating sewage at places in the parks where large rivers or lakes, which are not used as sources of domestic water supplies, are available for receiving the sewage. This type of plant is used at 7 places in Yellowstone Park where there are large hotels, lodges, and camp grounds. The

design of the settling tank used is shown in Figure V.

A uniform amount of chlorine, which is sufficient to disinfect the sewage at the maximum rate of flow, is added continuously to the effluent of a settling tank as it is discharged through vitrified pipe to the bottom of a contact tank which has a detention period of approximately 15 minutes at the time of maximum flow of sewage through the tank.

An inspector visits these plants daily to test the effluent for free chlorine and adjust the chlorine dosage. In adjusting the flow of chlorine to the maximum rate of flow of sewage, there is a fairly high chlorine residual during the night, but it has never had any effect on fish in the streams receiving the sewage. An attempt is made to maintain a chlorine residual of not less than 0.5 p.p.m. at all times.

In the fall of the year all the sludge is either drawn off from the tanks by gravity to prepared beds, or it is pumped out by portable gas-engine-driven diaphragm pumps and the tanks emptied and cleaned.

SETTLING TANKS AND SPRAYING SYSTEMS

In many of the national parks there are hotels, lodges, and tourist camps located in places, usually in the mountains, where the topography and other local conditions are unfavorable for the location, construction, and operation of the commoner types of sewage treatment or disposal plants, and where it is much less expensive and often more satisfactory in many ways to treat the sewage in settling tanks and spray the effluent, disinfected when advisable, over natural ground surfaces, usually hill-sides of porous material and covered with vegetation. This method of sewage disposal is generally used at areas

TABLE V
OPERATING DATA AND CHEMICAL ANALYSES, SEWAGE TREATMENT PLANT YOSEMITE NATIONAL PARK

Month 1933 1934	Sewage flow 1,000 gal. daily	Aeration tanks			D. O. final efflu- ent p.p.m.	B. O. D. effluent clarifiers p.p.m.		Sludge digestion tanks		Chlorine			
		Cu. ft. air per gal. sewage	Per cent settle- able solids	Per cent suspend- ed solids		pH efflu- ent	first	second	pH	Temp. deg. F.	lb. per day	p.p.m.	Resid. p.p.m.
Jan.	73	10.7	18	0.22	6.5	9.4	6.6	0.6	7.1	63	19	31	1.9
Feb.	62	8.7	23	0.24	6.5	10.9	4.2	1.4	7.1	58	9.3	18	1.8
Mar.	84	5.8	24	0.19	6.8	10.5	4.3	2.1	7.2	59	9.0	13	1.8
Apr.	207	2.6	21	0.19	6.2	9.7	4.3	2.0	7.2	65	12	6.9	2.0
May	272	1.7	20	0.19	6.3	9.1	3.8	1.0	7.2	67	16	7.1	2.1
June	661	1.7	19	0.21	6.1	6.3	5.1	2.0	7.1	64	40	7.3	1.8
July	665	1.9	20	0.23	6.0	4.3		1.3	7.1	66	65	12	1.8
Aug.	540	2.7	23	0.21	5.9	6.1	4.4	0.9	7.4	75	39	12	2.0
Sept.	363	2.0	23	0.22	6.2	6.5	4.6	0.9	7.3	75	24	7.9	2.3
Oct.	233	3.1		0.17	6.3		5.8		7.3	84	12	6.3	2.1
Nov.	164	4.1	12	0.10	6.6	8.7	5.2	1.3	7.2	80	10	7.3	2.7
Dec.	161	3.3	11	0.12	6.4	8.9	4.9	1.1	7.3	73	8.6	6.4	1.8
Jan.	186	3.3	11	0.11	5.8	8.7	5.7	0.9	7.2	71	13	8.4	
Feb.	189	3.3	12	0.11	5.9	9.0	6.0	1.4	7.2	72	12	7.8	
Mar.	254	2.4	9.5	0.08	6.1	9.4	5.7	1.4	7.4	68	12	5.5	
Apr.	360	1.5	11	0.10	6.2	8.3	6.5	1.4	7.3	75	15	5.1	2.1
May	537	1.7	8.7	0.11	6.0	7.2	6.8	1.8	7.4	75	33	7.3	
June	645	1.9	13	0.13	5.8	6.2	5.7	1.2	7.1	70	72	13	2.4

Note: Figures in table represent

Note: Figures in table represent averages of daily records.

which are open to visitors only during the warmer seasons, and when there is little rainfall. There are 10 of these plants in the parks, with disinfection of the effluent at 3. Typical examples of this type of treatment plant are at Giant Forest and Lodgepole Camp in Sequoia National Park.

At Giant Forest, with a population of approximately 1,000 during the summer, the sewage is treated in a settling tank and the effluent applied by a siphon to sprays which are set in a pipe line approximately 800' long and operate under a head of approximately 50'. Below the sprays there is a heavy growth of trees and shrubbery and the soil for a depth of 2' is porous. The spraying system is located where the drainage area above is small and where the nearest stream below is approximately 1 mile away. The loose material and the vegetation absorb practically all of the effluent and no sewage has ever been found flowing over the ground at a distance of more than 500' below the sprays. This plant has been operated during the summer and fall months for 7 years. There is a slight odor of fresh sewage at the settling tank and where the sewage is sprayed over the hillside, but it cannot be detected 100' from the disposal plant. The absence of an odor nuisance at this and at most of the plants is due no doubt to the fact that the sewage is unusually fresh when it reaches them and that there is little decomposition in the settling tanks.

At the Lodgepole Camp, the sewage from an automobile tourist camp with a population of approximately 300, and a government utility area with 25 employees, is treated in a settling tank and the effluent, disinfected with chlorine, is applied by alternating siphons to sprays set on 2 separate pipe lines each 300' long and approximately 15' below the siphons. There

are trees and shrubbery below the sprays and the soil is sandy and loose. The effluent is disinfected to protect a stream which receives drainage from the area where the sewage is sprayed.

The areas used for the spraying systems at the different plants are selected where there is little drainage above and where the sewage will be sprayed over ground having no well defined depressions or channels. Whenever the sewage begins to flow in channels the adjacent sprays are closed and the ground is allowed to dry, and the soil raked. The design of the spraying system is shown in Figure IV.

SETTLING TANKS AND SUBSURFACE GALLERIES

In many areas where there are accommodations for a comparatively small number of visitors and where it is advisable for various reasons to have the sewage disposal system entirely below the surface of the ground, settling tanks and subsurface galleries are used. In these areas careful investigations are made to find suitable porous material, such as gravel or coarse sand.

The settling tanks, which are used from 4 to 6 months in the year, are cleaned each fall. These are designed for a capacity equal to the largest volume of sewage produced daily, with approximately an additional one-third capacity for storage of sludge. All the settling tanks which have been constructed have been designed on the above basis, and all of them are cleaned once a year. The filter galleries are open at the bottom and the covers consist of either concrete, redwood, or half-round corrugated galvanized iron. The half-round culvert pipe can be obtained in diameters ranging from 8" to 86". The length and width of gallery used in any particular case depends on the volume of sewage treated and the character of the subsoil. A typical disposal

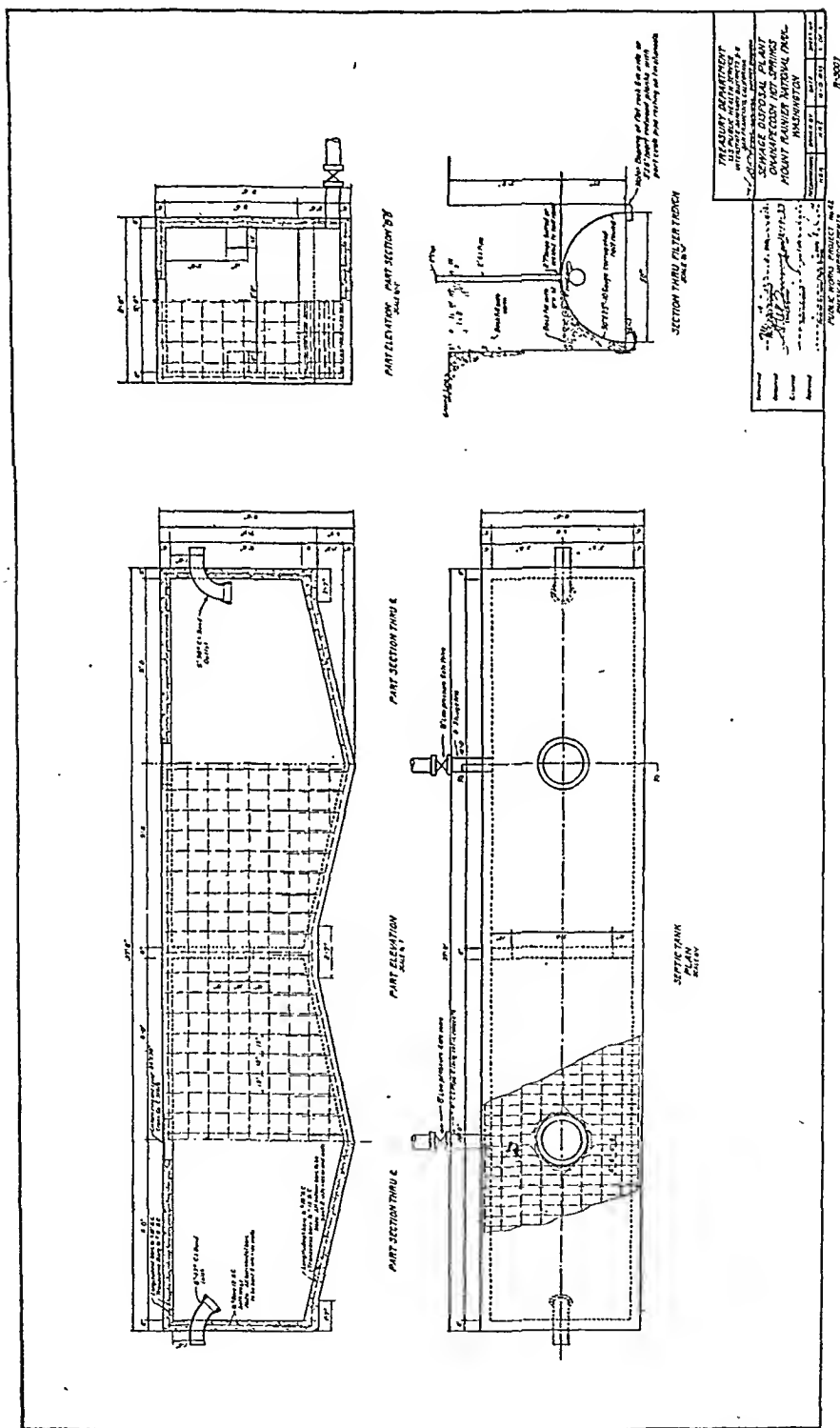


FIGURE V—Settling Tank and Sub-surface Gallery

plant of this type was constructed at Zion National Park to take care of the sewage from the headquarters area, housekeeping cabins, and automobile camp. In this area the only available site for a disposal plant is near the cabins, camp, and grounds used by visitors, and it was not advisable to have a sewage disposal plant above the ground. A design of a typical settling tank and subsurface gallery is shown in Figure V.

The effluent from the tank is piped to a diversion box from which it is discharged into 3 subsurface galleries each 100' in length and 5' in diameter. The subsoil is loose gravel and rock. The tank is covered with 2' of earth and the galleries are 5' below the surface.

There are 14 disposal plants of this type in the parks and all of them are operating satisfactorily. The main considerations which govern the successful operation of this type of plant are adequate storage for sludge and low settling rate in the settling tanks, porous subsoil, and sufficient area in the galleries.

SETTLING TANKS AND GLASS COVERED SAND FILTER

On account of unfavorable local conditions, particularly limited space, impervious subsoil and winter temperatures as low as -35° F., a septic tank and a covered intermittent slow sand filter, divided into 2 beds, were constructed in 1926 to dispose of the sewage from approximately 50 employees and their families in summer and 30 in winter, at the government utility area in Rocky Mountain National Park. The roof over the sand filter consists of wood with glass on the side exposed to the sun in winter. A general view of the sand filter is shown in Figure VI.

The effluent from the septic tank is applied to the sand filter by an automatic siphon. No difficulties have been

experienced in operating the filter in the winter with temperatures below zero for weeks at a time.

SETTLING TANKS AND OPEN TRENCHES

Settling tanks and open trenches in porous soil have been found a practical method of sewage disposal in several places, particularly where there is a comparatively small volume of sewage produced and trenches can be dug in porous soil in areas not frequented by visitors and where other methods of disposal are not practicable. The trenches are usually 2' in depth and 2' wide at the bottom, and at intervals of 100' there are dykes across the trench with pipes connecting the different sections. Disposal plants of this type are operated only during the summer season. A dense growth of algae develops in the sewage in the trenches and there are no odors noticeable 50' away. Each spring about $\frac{1}{2}$ " of surface material is removed from the trenches. This method of disposal is inexpensive, and where local conditions are favorable is a very satisfactory method of getting rid of sewage without danger of contaminating streams.

SETTLING TANKS, BROAD IRRIGATION, PONDS AND DISINFECTION

At the Mammoth Hot Springs area in Yellowstone Park there are housekeeping cabins, hotel, lodge, automobile tourist camp, general stores, with a

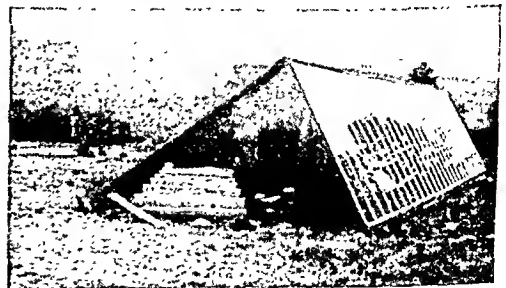


FIGURE VI—Glass Covered Sand Filter, Rocky Mountain National Park

permanent population consisting of employees of the government and public operators. This area is adjacent to the Gardiner River which is the emergency source of water supply for the town of Gardiner located on the river about 6 miles below the headquarters area. The population of the Mammoth Hot Springs area during the summer is approximately 1,250, and the permanent population during the winter averages about 125.

Two different methods of sewage disposal were considered for the Mammoth Hot Springs area. One included settling tanks, sprinkling filters, and disinfection of the final effluent which would be discharged into the Gardiner River, and the other included a settling tank and disinfection of the effluent which would be disposed of by broad irrigation, ponding, and disinfection of whatever sewage might overflow from the ponds. The latter method was adopted since it offered a greater measure of protection of the river against contamination, and the topography of the ground was favorable for this method of disposal. The component parts of the disposal system include settling tank, 3 chlorinators, broad irrigation, and ponds. One of the chlorinators is located at the headquarters area and is used to disinfect the small volume of raw sewage produced during the winter when the disposal plant is inaccessible on account of deep snow, and the other 2, one of which is used to disinfect the effluent from the settling tank and the other the overflow from the ponds, are operated during the summer and fall.

The effluent from the settling tank, during the time when the park is open to visitors and a large volume of sewage is produced, is discharged into open ditches which carry the sewage to the areas used for broad irrigation and to the ponds. During the winter the effluent from the settling tank does not

overflow the ditches and ponds, and broad irrigation is not necessary. A small amount of sewage which flows out of the ponds during the summer is discharged onto a sand bar and no doubt eventually reaches the river, but since it has been treated twice with chlorine and stored several days in ponds it is not believed the small amount of overflow from the ponds seriously contaminates the river water. An inspector visits the disposal system daily to adjust the flow of chlorine and regulate the flow of sewage to the areas under irrigation and to the ponds.

There is a slight odor of fresh sewage at the settling tank and a swampy odor near the ponds.

A few bacteriological analyses of samples collected during the summer from the overflow from the ponds before final disinfection showed that the *B. coli* group of organisms was present only occasionally in 1 c.c. portions.

This disposal plant was inexpensive to construct, costs only a small amount to supervise and maintain, and has produced very satisfactory results.

SUMMARY

The uniform policy followed with regard to the disposal of sewage in the national parks has been to avoid contaminating streams or interfering in any way with the use of streams for fishing or recreation, and to locate, construct, and operate treatment and disposal plants so that they will not only be free of odors and any other nuisance, but will conform to the high standards of the Park Service in relation to architecture and preservation of the natural scenery in the parks.

ACKNOWLEDGMENTS

The writer is indebted to P. A. Sanitary Engineer O. C. Hopkins and Sanitary Engineering Assistant H. R. Carlson for valuable assistance in the preparation of this paper, and to Hillard Hall and Russell White, opera-

tors, respectively, of the treatment plants at the Grand Canyon and Yosemite National Parks, for data furnished regarding the operation of these plants.

REFERENCES

1. Hommon, H. B. Sewage Treatment Plant at the Grand Canyon National Park. *Reprint No. 1249*

from *Pub. Health Rep.*, Oct. 5, 1928, U. S. Government Printing Office, Washington, D. C.
2. Hall, Hillard. Grand Canyon Activated Sludge Plant. *California Sewage Works J.*, V, 1, 1932-1933.
3. Hommon, H. B. Yosemite Valley Activated Sludge Plant. *California Sewage Works J.*, IV, 1, 1931.
4. White, Russell C. Operation of Yosemite Valley Activated Sludge Sewage Treatment Plant. *California Sewage Works J.*, V, 1, 1932-1933.

DISCUSSION

ARTHUR P. MILLER, F.A.P.H.A.

Sanitary Engineer, U. S. Public Health Service, New York, N. Y.

MR. Hommon's paper is of particular interest to me because, in 1921, I had the privilege of assisting him when he inaugurated the present system of controlling sanitary conditions in our national recreation areas. Three years of work in the western group of parks gave me a comprehensive picture of the magnitude of this task and of the peculiar difficulties which had to be overcome. In 1923, I was directed to return to the east and, about 1930, due to constantly increasing National Park Service activities in the eastern section of the country, Eastern and Western Divisions were established. Supervision of sanitation in the Eastern Division, which included all areas east of the Mississippi River and, in addition, Hot Springs National Park in Arkansas, was lodged in my office. I continued in charge of this work until 1934.

In 1921, in what is now the Eastern Division, the National Park Service administered only 2 areas, Acadia National Park in Maine, and Hot Springs National Park in Arkansas. I believe that very few people realize to what extent the number of national recreational, monumental, and historical areas under the careful supervision of that service has increased. Contrasted with the 2 areas in 1921, a summary this year shows the following:

TABLE I

National Parks	5	
National Historical Parks	1	
National Monuments	9	
National Military Parks	11	
Battlefield Sites	10	
Miscellaneous Memorials	4	
National Cemeteries	11	51
<hr/>		
National Parks (proposed)	3	
(Mammoth Cave, Shenandoah and Everglades)		
National Monuments (proposed) . .	2	5
<hr/>		
National Capitol Parks	1	
		<hr/> 57

These areas are not concentrated in any one section, but are well distributed throughout the East. Their geographical distribution is shown in Table II.

In the 2 older areas, Acadia and Hot Springs, sanitation has kept pace with the growth of the parks. Because of the importance of federal activities in the city of Hot Springs, the National Park Service is contributing generously to sewerage extensions and improvements and to new sewage disposal plants. The federal government's investment in those works has justified a controlling interest by the National Park Service in the selection of the designers and in the methods, efficiency, and continuity of plant operation. These interests are safeguarded in a

TABLE II

	<i>Natl. Parks</i>	<i>Natl. Parks (Proposed)</i>	<i>Natl. Historical Parks</i>	<i>Natl. Monu- ments</i>	<i>Natl. Military Parks</i>	<i>Battle- field Sites</i>	<i>Miscel. Memo- rials</i>	<i>Natl. Ceme- teries</i>	<i>Natl. Monu- ments (Proposed)</i>
Maine	1	..	..	..	..	..	..	..	..
New York	..	..	..	1	..	1	..	..	..
New Jersey	..	..	1	..	..	..	..	..	..
Pennsylvania	..	..	..	..	1	1	..	1	..
Maryland	1	..	..	..	..	2	..	1	..
Virginia	..	1	..	2	2	1	1	3	..
North Carolina	1*	..	..	..	2	..	1	..	..
South Carolina	..	..	..	1	1	1	..	..	..
Georgia	..	..	..	1	1*	1	1	..	1
Tennessee	1	..	..	1	4	..	1	4	..
Florida	..	1	..	2	..	..	..	..	..
Kentucky	1	1	..	..	..	..	..	..	1
Ohio	..	..	..	1	..	..	..	..	..
Mississippi	..	..	..	..	1	2	..	1	..
Louisiana	..	..	..	..	..	1	..	..	..
Arkansas	1	..	..	..	..	..	..	..	..
District of Columbia	1	..	..	..	..	..	..	1	..

* Also enumerated in Tennessee.

formal contract. I understand that a reputable mid-western firm has recently been awarded the work of designing this project.

There was recently completed in Hot Springs, a sewage disposal project for the public camp ground which included a system of collecting lines leading to a settling tank, the effluent from which is automatically pumped into sewage trenches on the only available tract of land, a fairly steep hillside adjacent to the main highway. The construction of these sewage trenches which are merely devices larger than the customary tile lines to permit infiltrating and seepage of clarified effluent into the ground, was complicated by heavy rock formations. Finally, blueprints had to be cast aside and sufficient patches of soil suitable for percolation sought on the ground. By this method we were able, eventually, to secure what we considered adequate seepage area. A similar system was designed for the principal public camp in Acadia. There, however, we were fortunate in having a small lake to receive the tank effluent.

One of the newer eastern areas, Colonial National Monument at Yorktown, Va., has received considerable attention. This monument has not yet developed to the point where a comprehensive sewerage project is warranted. Therefore, we solved the immediate problems by installing 4 separate settling tanks with arrangements for discharging clarified effluent into the ground. These installations were at different points in the federal territory, the idea being to provide sufficient facilities to care for the rapidly increasing tourist travel to this historical section. The need for definite and certain soil borings before the construction of any ground disposal scheme was demonstrated last year when we found one of our trenches ineffective. Tight soil, unobserved before design, has partially destroyed the usefulness of this particular installation and it will have to be expanded into a nearby area containing sandy loam of sufficient porosity to satisfy percolation requirements.

During the celebration of the Yorktown Sesquicentennial celebration in

1931, interesting problems were met in the provision of temporary sewage disposal facilities adequate to care for an estimated attendance of 100,000 people in 4 days. Utilizing large batteries of carefully attended and supervised pit privies, combined with a can system on a public water supply watershed, we successfully satisfied the needs of the situation without complaints.¹

At the George Washington Birthplace National Monument, small settling tanks with provisions for ground infiltration of the effluent have been built in four places. Here, again, the character of the monument did not justify a single system. Incidentally, before the organization of the Eastern Division, Mr. Hommon had much to do with the original installations in Colonial and George Washington's Birthplace National Monuments.

The other areas in this division are so new or have been acquired so recently that the provision of sewage disposal facilities has not yet progressed far. However, because of the procurement of funds from the Public Works Administration and on account of the need for usefully employing people without work, much activity is contemplated in many areas and some is going ahead at once.

In both the Great Smoky Mountain National Park (Tennessee and North Carolina) and the Shenandoah National Park Project (Virginia) headquarters development, public camping areas, privately owned but governmentally controlled concessions, will all require

systematically planned and substantial works for waste handling. These two large and beautiful areas situated in the midst of heavily populated sections will serve as recreation grounds for great numbers of people. These are not small areas. The final development authorized in the Great Smoky Mountain National Park includes 427,000 acres which makes it about two-thirds the size of Grand Canyon National Park, approximately four-sevenths as large as Yosemite National Park and somewhat larger than Sequoia National Park. A free and open park of this size in the center of the populous South is bound to attract many visitors.

Mammoth Cave National Park project (Kentucky) and the latest authorized one in the Florida Everglades; the National Historical Park at Morristown, N. J.; National Monuments like those at Fort Pulaski, Ga., and Fort Matanzas, Fla.; and National Military Parks such as Gettysburg, Shiloh, Vicksburg, Chattanooga and Chickamauga, are all being developed "for the benefit and enjoyment of the people." Keeping pace with the National Park Service, the Public Health Service will continue its coöperative efforts in the sanitary field insuring the guests of the national government the most adequate and convenient sanitary facilities possible under the circumstances existing at each site.

REFERENCE

1. Miller, Arthur P. Keeping a Celebration Area Clean. *Municipal Sanitation*, 3, 7, 1932.

Significance of Bacteriological Methods in the Diagnosis and Control of Whooping Cough^{*}

PEARL KENDRICK, Sc.D., F.A.P.H.A., AND GRACE ELDERING†

*Associate Director, and Bacteriologist, Michigan Department of Health,
Bureau of Laboratories, Western Michigan Division,
Grand Rapids, Mich.*

A YEAR ago at the meeting of this society we¹ reported our first year's experience with routine cough plate examinations for *B. pertussis*. We presented particularly the methods employed, a summary of the year's findings, and a discussion of the practicability of the procedure under the conditions in our community. In the present report we wish to add the data of the second year and point out the ways in which our laboratory findings are being applied in the local health department in a program of whooping cough control, and finally, to outline the criteria employed in our choice of cultures and technic for the preparation of specific vaccines used in our whooping cough prevention study.

A few comments on the *etiology of pertussis* are pertinent. Some workers have been deterred from attacking the pertussis problem because of the doubt raised by some, notably pathologists, as to the etiologic significance of *B. pertussis* and the emphasis they place on

the possible rôle of an elusive filtrable virus in the disease. Intranuclear inclusions and interstitial bronchopneumonia have been noted in a certain per cent of pertussis autopsies. McCordock and Muckenfuss² regard this particular type of pneumonia as a type reaction to the presence of a virus and a bacterium. McCordock and Smith³ have analyzed the various possible interpretations of their findings of inclusion bodies and interstitial bronchopneumonia in whooping cough. By analogy with swine influenza they suggest that since similar inclusions are sometimes found in children with no history of whooping cough, pertussis may be a mild virus disease which is of little consequence without a simultaneous or secondary bacterial infection complicating the condition. In other words, the Bordet-Gengou bacillus represents the bacterial component in a hypothetical virus-bacteria complex necessary for the production of the whole picture of whooping cough. Even were this proved, the diagnosis of the disease and probably specific methods for prevention would depend upon the bacterial component. The fact remains, however, that such a virus has not been demonstrated while the association of *B. pertussis* with the disease is unquestionable.

^{*} Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

† With the coöperation of the City Health Department of Grand Rapids, A. H. Edwards, M.D., Health Officer.

The finding of this organism in cases of whooping cough—from the mildest to the most severe infections—approaches 100 per cent as the technic approaches perfection, and the organism is not found in the absence of this disease. Further, pertussis has been produced by the culture in laboratory animals as evidenced by more recent reports such as those of Sauer and Hambrecht,⁴ Rich, Long, Brown, Bliss and Holt,⁵ and Shibley,⁶ who used special technic to assure the freedom of the culture from a filtrable virus; and experimental pertussis in children has been reported by MacDonald and MacDonald.⁷ Added to this are the encouraging reports of some, notably Madsen and coworkers⁸ and Sauer⁹ on the results of specific vaccines prepared from recently isolated cultures. A summary of various data in favor of the etiologic rôle of *B. pertussis* by Miller¹⁰ gives considerable material relevant to this subject.

On the basis of the accumulated evidence we believe there is no excuse for us to cease our efforts toward whooping cough prevention. Rather, there is good reason for proceeding on the assumption that *B. pertussis* is the cause of whooping cough; and accepting this, the study naturally centers around the organism *B. pertussis*.

THE BACTERIOLOGICAL DIAGNOSIS OF WHOOPING COUGH

Methods—The technic employed in cough plate diagnostic procedure has been outlined in previous communications.^{1, 11} The exposure of cough plates has been done almost entirely during the past year by 25 nurses in the Bureau of Public Health Nursing.* This is part of a coöperative plan instituted about a year ago between the Health Department of Grand Rapids and the physicians of the city. Upon the re-

quest of a physician the nurse in the particular district secures a diagnostic cough plate, and the laboratory findings are reported to both physician and City Health Department. If the first plate is negative or unsatisfactory and the diagnosis of whooping cough has not been ruled out in the meantime, a second plate is obtained. If either plate is positive or if both are negative and the patient has definite clinical signs of whooping cough, isolation is established and release plates are taken as explained later under the section on release measures.

Between November 1, 1932, when diagnostic cough plate service was instituted on a routine basis and August 1, 1934, 984 plates were examined, not including 40 which have been reported as unsatisfactory for some reason such as insufficient inoculation or overgrowth with contaminants. The results are summarized in Table I.

TABLE I
SUMMARY OF COUGH PLATE EXAMINATIONS

CLINICAL DIAGNOSIS	Number of Cough Plates		
	Posi- tive	Neg- ative	Total
Whooping cough through 4 weeks	254	160	414
Post-whooping cough 5 wks. to 6 mos. after onset	13	242	255
Other than whoop- ing cough	0	218	218
Clinical data not available	0	97	97
Totals	267	717	984
Unsatisfactory			40

In clinical whooping cough, the correlation of the stage of disease with positive cough plate findings is always of interest and significance. Particularly, such findings give us an indica-

* Under the direction of B. Randle

tion of the probable period of infectivity and therefore of a reasonable isolation period. In Table II are the results of plates from 332 cases of whooping cough.

TABLE II

WHOOPIING COUGH CASES:
SUMMARY OF PLATES CORRELATED WITH
STAGE OF DISEASE

WEEK OF DISEASE	Posi- tive	Neg- ative	Total	% Pos- itive
1	91	25	116	78
2	80	45	125	64
3	58	36	94	62
4	25	54	79	32
5	10	56	66	15
6	1	30	31	3
Totals	265	246	511	

By comparison with our report of a year ago,¹ it will be seen that with the addition of more material, the percentages of positive plates during different weeks of disease have been changed somewhat but the essential picture is the same. The data suggest that a relatively high per cent of patients are infective throughout the first 3 weeks of disease, a progressively smaller per cent continue so through the 4th and 5th weeks, while only an occasional individual remains so after the 5th week.

Comment—The increasing number of physicians taking advantage of the cough plate diagnostic service is an indicator of the assistance bacteriological findings give them. While 22 used the cough plate service during the first year, 70 have received laboratory reports during the second. Many instances attest to the aid these reports have given in establishing the diagnosis of the atypical, light, or second attack of whooping cough, and in obtaining an

early diagnosis before the characteristic cough has developed. The experience of these 2 years leaves little room for doubt as to the practicability and value of the bacteriological diagnosis of whooping cough.

BACTERIOLOGICAL FINDINGS AS A BASIS FOR ISOLATION AND RELEASE

PROCEDURES

The data on the presence of *B. pertussis* at various stages of the disease (see Table II) suggest that if an arbitrary isolation period were to be chosen at the termination of which over 90 per cent of the patients would be noninfective, it would be 5 weeks. A week earlier than this, an appreciable number would still be infective.

The feasibility of using release cultures in whooping cough has been recognized by certain authors, for example Lawson and Mueller,¹² but we have seen no report of their actual application. For the past year we have been attempting such a test. The relatively low incidence of whooping cough in the city during this time has made possible the extra labor involved in the various divisions of health department and laboratory, though it has limited the quantity of our data. As an indication that the regulations as tested are not considered impossible from the standpoint of administration, they were recently incorporated in the local communicable disease regulations, as follows:

1. Cases and suspected cases shall be reported.
2. Patients shall be isolated on the basis of either clinical or bacteriological diagnosis.
3. A warning placard shall be placed on the home.
4. Patients shall be released 35 days after onset of disease (first symptoms), if the cough plate is not employed.
5. A patient may be released on the 28th day after onset of disease if there have been two consecutive negative cough plates taken at least 24 hours apart, the first one taken not earlier than the 21st day after onset.

If one of the first two release plates is positive, the third plate should not be taken before the 28th day.

6. Every effort shall be made to encourage voluntary isolation of a patient while the first cough plates are being examined or until the clinical diagnosis has been made.

Results of the application of bacteriological release—The findings of actual release plates agree very closely with what might be expected from the accumulated data on the per cent of positives during the various stages of the disease. The results to date are summarized in Table III.

TABLE III
RELEASE COUGH PLATE FINDINGS

Release cough plates		Patients for release		
Week obtained	Number of plates	Total patients	Released	% Released
4th	86	58	33	57
4th and 5th	125	69	63	91
4th, 5th & 6th	155	83	82	99

In starting our study of release procedures, we were not always able to obtain a complete series of plates from each patient, so the 3 periods analyzed—the 4th week; 4th and 5th; and 4th, 5th, and 6th weeks; respectively—are considered as separate units. For instance, if a patient had 1 or more positive plates during the 4th week and hence was not ready for release, but for some reason further plates were not secured, data pertaining to him were included only in the first period.

Our findings show that 33 of 58 patients or nearly 60 per cent were released on the basis of negative cultures taken during the 4th week. Further plates, all negative, were submitted by some of the 33 patients after the 4th week,

thus strengthening the basis for their early release. Of the second group—those included during the 4th and 5th weeks—only 6 of 69 individuals, or less than 10 per cent, remained positive at the end of the period. In the cumulative data of the 4th, 5th, and 6th week interval, only 1 of 83 cases had not been released at the end of the 6th week. In general, the application of the cough plate method shortens the isolation period for the majority of cases and lengthens it for a relatively small group.

It is of interest to follow the findings of a series of plates from a few individual cases for release. In Table IV are shown 5 such series. George and Jerry, who are typical of over half the cases, had 2 consecutive negative plates during the 4th week. Allowing 4 days for incubation of the plates before the laboratory report is made, such patients would be released about 28 days after onset. Donald's and Richard's first release plates were positive and it was the end of the 5th week before they could be released. Marvin's case proves the desirability of more than 1 release plate, since his first was negative followed by 2 positives. A requirement of more than 2 negative plates would no doubt add an occasional positive finding

TABLE IV
A FEW TYPICAL FINDINGS IN CASES FOR RELEASE

Patient	Cough plates: results and day of disease		Day of release by laboratory report
	Diagnostic	Release	
George	+ 4	-23-24	28
Jerry	+ 9	-25-26	30
Donald	+ 7	+24-29-30	34
Richard	+ 9	+23+24-30-31	35
Marvin	+14	-27+29+34-35-40	44

but we believe the additional burden not warranted. Further, continued isolation through the 4 day interval between receipt of the plate at the laboratory and the negative report adds a margin of safety.

With the regulations as tested, our findings suggest that in whooping cough, bacteriological release can be made as efficient as in certain other diseases where it is accepted without question. Whether the procedure can or should be applied generally is a question for study under the conditions of different communities.

B. PERTUSSIS VACCINE PREPARATION

If *B. pertussis* is the etiologic agent in pertussis, there is a sound basis for expecting some protection against whooping cough from a suitably prepared, properly administered vaccine. In general, the literature since 1906, when trials of vaccine were begun, does not give convincing support for such protection. An analysis of the different reports, however, shows little basis for comparability of results. Some workers have used vaccine after the onset of disease, some after exposure but before symptoms, a few at a considerable time before exposure, and some at undefined times. The age groups, geography and epidemiology have all supplied variable factors; the dosage has not been sufficiently considered; and adequate controls frequently have been lacking. In the light of more recent knowledge of the antigenicity of cultures and with the encouragement of the more recent results of Madsen and coworkers⁸ and of Sauer,⁹ there is good reason for a reinvestigation of the value of *B. pertussis* vaccine. The problem is one for a carefully controlled, longtime study, and conclusive evidence must await an analysis of the results obtained by different investigators.

In the meantime, much is to be gained in a definition of conditions under which

different investigators are working. It encourages open discussion of the different factors involved which may lead to some general agreement on the essential requirements for technical procedures. It is in this spirit that we briefly outline the methods employed in the preparation of *B. pertussis* vaccine as used in our study—not as the perfect solution of the complex problem. The methods represent to us a starting point for future studies—a line of procedure to be adhered to in its essentials for a sufficient time to give our results meaning and to furnish a sound basis of judgment.

Selection of suitable cultures—The first point is the suitability of the cultures to be used. Lack of conformity among different workers on this point could provide ample explanation for widely divergent results.

If certain profusely growing old laboratory strains of *B. pertussis* were satisfactory, vaccine preparation would be relatively simple. We have reason to question their suitability since we know that they may be serologically quite distinct from cultures just isolated from patients with whooping cough—cultures which, in general, form a homogeneous serological group, "Phase I" of Leslie and Gardner. Madsen⁸ and Sauer⁹ have recognized this in their specification of "recently isolated" cultures. The date of isolation has been a helpful temporary criterion but it is an inexact and superficial one. Just where shall we draw the line between a "recently isolated" and an "old" culture? Can we be sure in substituting a week-old culture for one 6 months old that we have improved the antigenicity of our vaccine? We agree with Hawley and Simmons¹⁵ in connection with typhoid vaccine, that their practical problem may be more concerned with determining and maintaining the desirable state of their culture than with the search for one recently isolated.

In *B. pertussis* vaccines the essential problem is to determine the antigenically effective state and the means of sustaining it. Above all, we need *adequate criteria* for judging the state of the culture. While the final test is whether the vaccine protects against whooping cough, we must have practical laboratory indicators for accepting or refusing any particular culture for a lot of vaccine. Accepting the thesis that the culture just isolated from a patient with whooping cough is the most likely to be antigenically active in a vaccine, we have studied numbers of such cultures in an effort to arrive at the significant characteristics by which to judge them. In these studies,¹⁰ we have made use particularly of serological relationships, pathogenicity for mice and guinea pigs and the intradermal test in the rabbit. We believe they have demonstrated that certain characteristics are of such uniformity and significance as to furnish reliable guidance in judging the antigenicity of cultures. In the present state of our knowledge we accept the following *criteria for selecting cultures* for a vaccine:

1. *Typical morphology and growth characteristics* including hemolysis on Bordet-Gengou medium. These are described by various authors, including ourselves.¹

2. *Agglutination to high titer* by smooth strain anti-serum (Phase I, Leslie and Gardner). For agglutination tests we use the rapid method previously described.¹¹

3. *Phase I agglutinin production* in the rabbit. The rabbit is injected intravenously at 3 day intervals with 0.2, 0.4 and 0.8 c.c. per kg. weight, successively, of a 10 billion per c.c. saline suspension of organisms killed with a preservative such as merthiolate 1:10,000, or phenol 0.5 per cent. A bleeding on the 6th or 7th day after the 3rd dose is usually from 1:2,000 to 1:5,000 final titer, rapid test (1:10,000 to 1:25,000, equivalent titer) with any Phase I culture.

4. *Typical rabbit skin reaction* of hemorrhagic necrosis. A dose of 0.1 c.c. of a 1 billion per c.c. living, saline suspension of a Phase I culture gives a characteristic reaction. Typically, within a few hours there is an ischemic, indurated area at the site of inocu-

lation. By 24 hours there is a purplish hemorrhagic center which progresses to necrosis, scab formation and final scarring. This reaction has been recognized by several workers and recently described by Gundel and Schlüter.²⁰ Its value in studying *B. pertussis* cultures was discussed in a previous paper.¹⁰

While developing these criteria, we have also given attention to the date of isolation. In general, we have used 6 cultures for each lot—all isolated within 3 months and 3 of them within 1 month. We believe this age factor is unimportant, provided the cultures have the characteristics described. Further, we are not convinced that several cultures are superior to one, properly chosen, but we continue to employ several while this point is under study.

Choice of technical methods—Having decided upon the cultures, we are confronted with the necessity of choosing technical procedures. Our objective should be to grow the cultures in such a way as to maintain their *antigenicity*; to determine the conditions of *maximum growth* consistent with maintenance of the antigenic state; to kill and preserve them *without denaturing* the active antigens; and, finally to provide a *safe* product. In choosing particular technic, we have been guided by practicability in so far as it did not conflict with these essential requirements.

We have found that cultures maintain their Phase I characteristics on the Bordet-Gengou medium used for cough plate,¹ so have used this medium in growing cultures for vaccines. We are trying out a similar medium with added veal infusion and peptone, in line with that used in Copenhagen and described by Miller.¹⁴ This supports a heavier growth, and our adoption of it awaits only further tests of the antigenicity of the cultures.

The *kind of blood* to use in the medium has been emphasized by Sauer¹⁷ in his insistence upon human blood. As to the maintenance of Phase I antigenic properties, we have found

no difference between human and sheep's blood. As to the safety factor, there are no convincing theoretical grounds, and in our experience with the inoculation of several hundred children, there is no experimental basis for any fear in this regard. Since we have found human and sheep's blood equally satisfactory, we use sheep's blood as it provides a far more uniform, constant, and less limited supply than is available from human sources. In the meantime, this point is under continued study.

We need to know the *optimum state* with respect to antigenicity in which to administer the vaccine. Most vaccines have been suspensions of whole organisms. Kreuger, Nichols and Frawley¹⁸ recently described a water-clear pertussis antigen prepared by grinding washed cultures in a ball mill for 12 hours and subsequent filtration through a collodion membrane. We shall watch the use of this with great interest. As for our own studies, our first aim is to satisfy ourselves in a carefully controlled series of injections, as to the results of the *whole culture vaccine*. If definite protective value can be established for such vaccines by different investigators, and the conditions of their success defined, there will be a sound basis for the judgment of modified and improved antigens.

The question of *washing the suspension* arises. We have to choose between an unwashed product which carries with it agar, blood and other medium derivatives and a washed vaccine relatively free from them. A washed product surely is preferable if significant antigenic properties are not lost. Since we have found the washed live culture capable of giving a typical skin reaction and a vaccine, even after 3 washings, capable of stimulating Phase I agglutinins rapidly and in high titers, we decided on a *washed product*. The growth is washed off the medium

into physiological salt solution, its turbidity adjusted roughly to approximately 10 billion organisms per c.c. by comparison with known suspensions, and the organisms washed once by centrifugation and the supernatant fluid discarded. The sediment is resuspended in saline and filtered through cotton.¹¹

As to the killing and preserving of the vaccine in such a manner as to leave the active antigens unimpaired, there is need for further study—in this as in other vaccines. We have avoided the use of heat and have killed the cultures by chemicals. We have used merthiolate 1:10,000 and in some lots phenol 0.5 per cent. In either case we obtain a vaccine which is effective in stimulating Phase I agglutinin production in the rabbit.

The method of *standardization of the density of suspension* is another point for consideration. Our first counts by Wright's method showed a great variation. We made an extended series of counts by this method and in different types of chambers in comparison with the determination of per cent of suspension by the Hopkins tube, and concluded that the Hopkins method gives far more uniform results and that it is an immeasurably more simple method of standardization. Our comparative tests indicate that a 0.3 per cent suspension by this method represents approximately 10 billion organisms per c.c. The suspension to be tested is adjusted roughly by turbidity to slightly heavier than that required, a volume of 5 c.c. is centrifugated at 2,500 r.p.m. in a Hopkins tube for 30 minutes, estimations made from the measured sediment and the suspension adjusted to 0.3 per cent.

In brief, our vaccine is a once-washed, 0.3 per cent suspension of Phase I *B. pertussis* grown on Bordet-Gengou medium enriched with 15–20 per cent sheep's blood. The organisms are killed

with a preservative such as merthiolate 1:10,000 or phenol 0.5 per cent allowed to act at cold room temperature for a week or more. The product is tested for purity and sterility by the usual procedures of staining, aerobic and anaerobic broth cultures and Bordet-Gengou medium cultures; for safety by guinea pig tests; and for antigenicity as indicated by agglutinability with Phase I serum and by ability to produce Phase I agglutinins in the rabbit rapidly and in high titer.

COMMENT

As public health workers, we need to realize the seriousness of whooping cough as a communicable disease of childhood. The important place it holds as to cause of mortality, morbidity and pathological sequelae is emphasized in a recent report of the League of Nations Health Committee.²¹ It is pointed out in this report that the death rates from whooping cough and measles have declined more slowly during the past 30 years than have those from diphtheria and scarlet fever, and consequently their relative importance as a cause of death has increased. During 1926-1930, in 6 countries including the United States, whooping cough was responsible for about one-third of the total deaths from diphtheria, scarlet fever, whooping cough, and measles. In the period 1927-1929, the same proportion held true in the United States for the total deaths, while in the age group 0-4 years, whooping cough was responsible for 43.5 per cent of all deaths from these 4 diseases; diphtheria, 30.6 per cent; measles, 19.1 per cent; and scarlet fever, 6.6 per cent.

The need for a study of whooping cough control measures is obvious. While the problem is a complex one, we should not avoid it as being impossible of solution. A note of hope is

struck in an editorial of the *British Medical Journal*¹⁹:

A survey of all this recent work leaves us with hope that this plague of the nursery and school, which in 1932 caused 300,000 infections in the United States and upwards of 6,000 deaths, will in time be as controllable as diphtheria now is to those who choose to benefit by methods at our command.

We believe that bacteriological methods as discussed in this paper offer reasonable promise of aid and deserve a thorough trial under conditions as favorable to their success as we can make them. The more widespread their use, the more centers there will be for studying various phases of the whole problem—for it is only in such centers that there is the necessary background for a comprehensive study of the subject.

SUMMARY

We have summarized the results of nearly 2 years' routine laboratory examinations for *B. pertussis* and have pointed out their application to the diagnosis of early, light and atypical whooping cough; to isolation and release procedures; and to the study of specific methods for whooping cough prevention.

Whooping cough isolation and release procedures which have crystallized out of our bacteriological study are now under test as a part of Grand Rapids Health Department communicable disease regulations.

Criteria for the selection of cultures and for the choice of technic employed in preparing vaccines for whooping cough prevention studies have been discussed.

REFERENCES

1. Kendrick, Pearl, and Eldering, Grace. Cough plate examinations for *B. pertussis*. *A.J.P.H.*, 24: 309 (Apr.), 1934.
2. McCordock, H. A., and Muckenfuss, R. S. The similarity of virus pneumonia in animals to epidemic influenza and interstitial bronchopneumonia in man. *Am. J. Path.*, 9:221, 1933.

See also "Whooping Cough," Report of the Referee, Pearl Kendrick, p. 155, Year Book (Supplement).

3. McCordock, H. A., and Smith, M. G. Intra-nuclear inclusions. *Am. J. Dis. Child.*, 47:771-779 (Apr.), 1934.
4. Sauer, L. W., and Hambrecht, L. Experimental whooping cough. *Am. J. Dis. Child.*, 37:732, 1929.
5. Rich, A., Long, P., Brown, J. H., Bliss, E., and Holt, L. E. Experiments upon the cause of whooping cough. *Science*, 76:330 (Oct. 8), 1932.
6. Shibley, G. S. Etiology of whooping cough. *Proc. Soc. Exper. Biol. & Med.*, 31:576 (Feb.), 1934.
7. MacDonald, H., and MacDonald, E. J. Experimental pertussis. *J. Infect. Dis.*, 53:328 (Nov.-Dec.), 1933.
8. Madsen, T. Vaccination against whooping cough. *J.A.M.A.*, 101:187 (July 15), 1933.
9. Sauer, L. Whooping cough: A study in immunization. *J.A.M.A.*, 100:239 (Jan. 28), 1933.
10. Miller, J. J. Etiology of whooping cough. *J.A.M.A.*, 100:681 (Mar. 4), 1933.
11. Kendrick, P. Rapid agglutination technic applied to *B. pertussis*. *A.J.P.H.*, 23:1310 (Dec.), 1933.
12. Lawson, G. M., and Mueller, M. The bacteriology of whooping cough. *J.A.M.A.*, 89:275, 1927.
13. Leslie, P. H., and Gardner, A. D. The phases of *Haemophilus pertussis*. *J. Hyg.*, 31:423 (July), 1931.
14. Miller, J. J. Experimental observations on the antigenic potency of *H. pertussis* extracts. *J. Immunol.*, 26:247 (Apr.), 1934.
15. Hawley, P. R., and Simmons, J. S. The effectiveness of vaccines used for the prevention of typhoid fever in the United States Army and Navy. *A.J.P.H.*, 24:689 (July), 1934.
16. Kendrick, P., and Eldering, G. A Study of *B. pertussis* cultures by means of animal inoculation. *J. Bact.*, 27:97, 1934 (abstract).
17. Sauer, L. The preparation of *Bacillus pertussis* vaccine for immunization. *J.A.M.A.*, 102:1471 (May 5), 1934.
18. Kreuger, A. P., Nichols, V. C., and Frawley, J. M. Preparation of an active undenatured antigen from *Haemophilus pertussis*. *Proc. Soc. Exper. Biol. & Med.*, 30:1097, 1933.
19. Editorial, *Brit. M. J.*, 3807:1177 (Dec. 23), 1933.
20. Gundel, M., and Schlüter, W. Experimentelle Untersuchungen über den Keuchhusten bazillus (*Bacillus Bordet-Gengou*), seine Diagnose und die Differentialdiagnose gegenüber Influenza-bazillen. *Centralbl. f. Bakt.*, Orig., 129:461, 1933.
21. Article. Relative importance of the principal infectious diseases of childhood (diphtheria, scarlet fever, whooping cough and measles.) *Epidem. Ref., Health Com., League of Nations*, R. E. 173: (May-June), 1934.

Weight of Children

1. Averages of weight of children in 1934 show no consistent or striking differences from averages of weight for the period 1921 through 1927.

2. The variability of body weight (measured by the standard deviation) is not, for boys, consistently different in 1933 and 1934 from that observed in the 1921-1927 period. For girls, weight is more variable in both 1933 and 1934 than in the earlier period.

3. The proportion of boys 12 per cent or more below average weight has not increased in 1933 or 1934, while the proportion of girls so designated is slightly greater, both in 1933 and in 1934, than that observed for the years 1921-1927.

4. Average annual gains in weight are lower for the year 1933-1934 than those calculated for the 1921-1927 period. The average for the several age-sex groups, of the ratio

Average annual gains in weight, 1933-1934

Average annual gains in weight, 1921-1927

equals 91.5 per cent. Comparing this ratio with similar average ratios for the separate

years 1921-1927 shows, however, that the relative gain for 1933-1934 is not significantly lower than that recorded in 1924-1925, a year in which general economic conditions were presumably much better than in 1933-1934. This finding, together with the fact that the actual weight of children has not decreased in the past decade, is taken as evidence that the recent economic depression has not materially affected the growth in weight of a representative sample of school children.

5. A supplementary study of the weights and weight increments of children from families in different levels of economic status in 1933 and 1934 shows that approximately the same differences are to be found as have been observed in times previous to the depression. From this it is concluded that there has been no obliteration or widening of class differences during the depression.—

Carroll E. Palmer, M.D., Further Studies on Growth and the Economic Depression, *Pub. Health Rep.*, Dec. 7, 1934, pp. 1468-1469.

Some Factors in the Epidemiology of Malaria*

HENRY HANSON, M.D., F.A.P.H.A., MARK F. BOYD, M.D.,
F.A.P.H.A., AND T. H. D. GRIFFITTS, M.D.

*State Health Officer; Director Malaria Research Division; and Director
Malaria Control Studies, Florida State Board of Health,
Jacksonville, Fla.*

THE factors concerned in the epidemiology of malaria are so numerous that it is difficult to choose the one appropriate to the opening of a discussion of this nature.

Owing to limited time the usual historical references must be left out and those interested in malaria history are referred to a voluminous literature on the subject. The geographical distribution of malaria covers a belt around the world wider than the tropics, extending irregularly into the temperate zones on both sides of the equator. In the north it is found to extend to points varying from 45° N. L. to 60° N. L. in the old world, and in the new world as far north as 40° to 42° N. L. To the south it covers nearly all South America with severe manifestations in the northern portion, along the Magdalena, Orinoco, and Amazon Rivers, and in the Guianas.

It is not practical to discuss the epidemiology of malaria on a world-wide basis, because such an effort would require volumes and more time than is allotted to the entire program of the Association.

Factors influencing epidemiology are:

1. Presence of persons with parasites in the blood

2. Presence of Anopheles of a species effective as a carrier

3. Accessibility of human parasite carrier to Anopheles

4. The presence of gametocytes in the blood of the parasite carrier

5. The age of the sporozoites, i.e., the length of time the mosquito has carried the infective agent. Boyd has found that infectivity is reduced with the age of the infected mosquito

6. Immunity to prevailing strains:

A. Latent infection. In the malaria research division of the State Board of Health, Boyd and Stratman-Thomas found it difficult to re-infect with the same strain individuals who had recovered spontaneously from an attack produced by that strain. The protective mechanism is thought to be associated with a continuing residuum of the infecting strain, which is spoken of as latent infection.

B. Racial tolerance to certain species of the parasite. For example, the negro is apparently highly resistant to *Plasmodium vivax* (benign tertian) but susceptible to *P. falciparum*. Boyd has found it very difficult to infect negroes with *P. vivax*, in fact, in some cases adult negro males "have been found with a tolerance that successfully resists the application of 16 *Anophelines* of proven infectivity." The refractoriness is believed to be racial and not acquired. (33rd Report Florida State Board of Health, page 76.)

7. The prevailing external temperature controls the length of time required for the development of the parasite in the mosquito, e.g., at 20° C. (68° F.) 17 days is required to complete the sporogenous cycle in the mosquito (extrinsic incubation). Tempera-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

ture and humidity also play an important part in the longevity of the mosquito, and, seasonally, the period of mosquito activity, hence the importance of relatively high winter temperatures in Florida.

The intrinsic incubation of tertian malaria varies from 10 to 20 days—longer periods are exceptions. Eighty-five and 97 days are said to have been observed. The parasite (*P. vivax*) is often found some days before the manifestation of clinical symptoms, sometimes 6 days before onset, a fact which may or may not influence the epidemiology (Boyd).

Gametocyte production is more constant and abundant in primary attacks of tertian than in recurrences. Consequently, mosquitoes feeding on a patient in the primary attack may develop more cysts and sporozoites than those feeding on patients in secondary attacks with a lower gametocyte production.

In *P. falciparum* (E.A.) the extrinsic incubation is 23 days at 20° C. according to Florida findings; the intrinsic is 8–15 days. Both the white and Negro

racess show a high degree of susceptibility to quartan.* Extrinsic incubation is 35 days. Intrinsic incubation is 27 to 42 days. Quartan malaria is more severe than tertian and more exhausting, but comparatively rare in the state.

In this paper we are dealing with factors in the epidemiology of malaria chiefly as we see it in Florida. Conditions which prevail in Northern Florida are very much like, if not identical with, those in Southern Georgia and Alabama.

1. The geographic distribution as represented by deaths reported to the Bureau of Vital Statistics of Florida has been the basis on which incidence is computed and is shown in Tables I and II for the years 1932 and 1933. In comparing the two tables it is noted that there was a decided increase in the number of deaths reported in 1933 as compared with 1932 (373 vs. 233).

The greatest concentration of cases occurs in the northern counties, the central group, opposite the southwestern portion of Georgia and southeastern

* In experimental work or malaria therapy.

FIGURE I

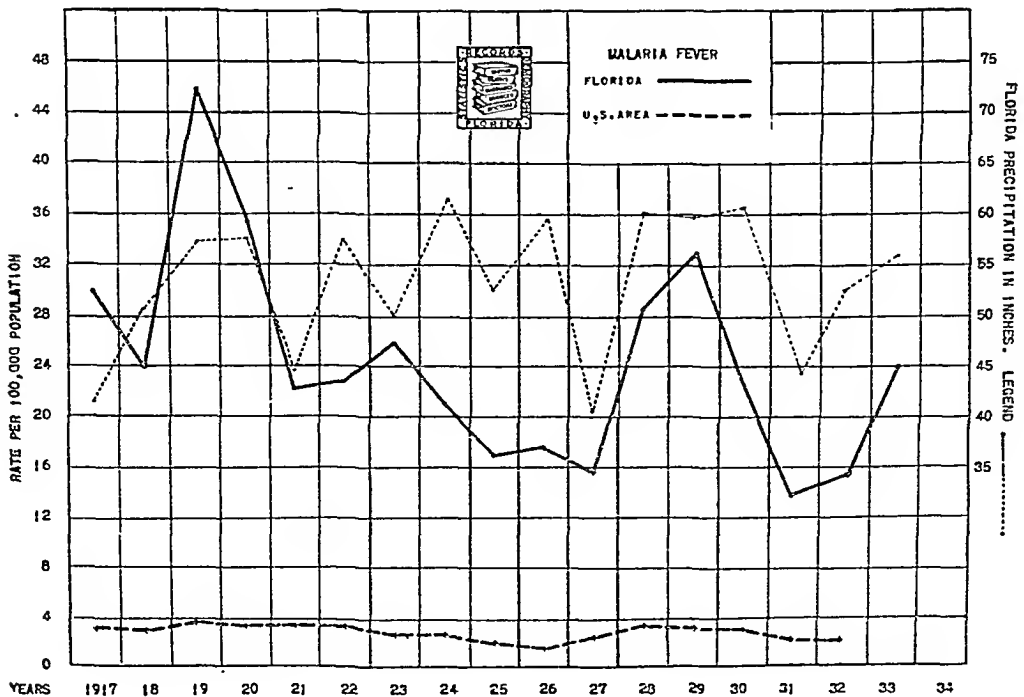


TABLE I

DEATHS FROM MALARIA, BY COLOR, BY MONTHS,
AND BY COUNTIES, FLORIDA, 1932

Central Bureau of Vital Statistics, Florida

<i>Counties</i>	<i>Total</i>	<i>W</i>	<i>C</i>
State	233	123	110
Alachua	7	4	3
Baker	0	0	0
Bay	5	5	0
Bradford	1	0	1
Brevard	0	0	0
Broward	2	1	1
Calhoun	7	6	1
Charlotte	2	1	1
Citrus	3	0	3
Clay	2	1	1
Collier	0	0	0
Columbia	10	7	3
Dade	2	2	0
DeSoto	2	2	0
Dixie	5	2	3
Duval	2	0	2
Escambia	5	1	4
Flagler	0	0	0
Franklin	2	1	1
Gadsden *	18	7	11
Gilchrist	3	3	0
Glades	0	0	0
Gulf	0	0	0
Hamilton	0	0	0
Hardee	1	1	0
Hendry	0	0	0
Hernando	3	2	1
Highlands	1	0	1
Hillsboro	4	2	2
Holmes	4	4	0
Indian R.	0	0	0
Jackson	14	7	7
Jefferson	10	2	8
Lafayette	2	1	1
Lake	1	1	0
Lee	1	0	1
Leon	10	7	3
Levy	5	4	1
Liberty	2	2	0
Madison	7	1	6
Manatee	8	5	3
Marion	13	4	9
Martin	1	0	1
Monroe	0	0	0
Nassau	1	0	1
Okaloosa	3	3	0
Okeechobee	0	0	0

TABLE II

DEATHS FROM MALARIA, BY COLOR, BY MONTHS,
AND BY COUNTIES, FLORIDA, 1933

Central Bureau of Vital Statistics, Florida

<i>Counties</i>	<i>Total</i>	<i>W</i>	<i>C</i>
State	373	207	166
Alachua	11	9	2
Baker	0	0	0
Bay	5	3	2
Bradford	2	2	0
Brevard	0	0	0
Broward	3	2	1
Calhoun	5	4	1
Charlotte	1	1	0
Citrus	4	1	3
Clay	1	0	1
Collier	0	0	0
Columbia	10	8	2
Dade	1	1	0
DeSoto	2	2	0
Dixie	1	1	0
Duval	12	10	2
Escambia	4	3	1
Flagler	1	1	0
Franklin	9	4	5
Gadsden *	16	4	12
Gilchrist	7	7	0
Glades	0	0	0
Gulf	0	0	0
Hamilton	8	4	4
Hardee	5	5	0
Hendry	0	0	0
Hernando	2	1	1
Highlands	0	0	0
Hillsboro	15	12	3
Holmes	8	8	0
Indian R.	0	0	0
Jackson	21	8	13
Jefferson	26	10	16
Lafayette	3	2	1
Lake	3	0	3
Lee	2	0	2
Leon	19	10	9
Levy	10	5	5
Liberty	2	2	0
Madison	20	7	13
Manatee	3	1	2
Marion	28	14	14
Martin	1	0	1
Monroe	0	0	0
Nassau	4	1	3
Okaloosa	0	0	0
Okeechobee	0	0	0

TABLE I

DEATHS FROM MALARIA, BY COLOR, BY MONTHS,
AND BY COUNTIES, FLORIDA, 1932

Central Bureau of Vital Statistics, Florida

<i>Counties</i>	<i>Total</i>	<i>W</i>	<i>C</i>
Orange	5	2	3
Osceola	1	0	1
Palm Beach	2	1	1
Pasco	3	2	1
Pinellas	6	1	5
Polk	8	8	0
Putnam	1	1	0
St. Johns	3	2	1
St. Lucie	0	0	0
Santa Rosa	0	0	0
Sarasota	1	0	1
Seminole	3	0	3
Sumter	2	1	1
Suwannee	3	2	1
Taylor	4	3	1
Union	2	1	1
Volusia	5	2	3
Wakulla	8	5	3
Walton	5	2	3
Washington	2	1	1

<i>Months, 1932</i>	<i>Total</i>	<i>W</i>	<i>C</i>
January	12	6	6
February	11	7	4
March	11	4	7
April	19	8	11
May	8	2	6
June	17	9	8
July	22	14	8
August	20	10	10
September	28	11	17
October	30	20	10
November	35	20	15
December	20	12	8

* State Hospital inmates included

TABLE II

DEATHS FROM MALARIA, BY COLOR, BY MONTHS,
AND BY COUNTIES, FLORIDA, 1933

Central Bureau of Vital Statistics, Florida

<i>Counties</i>	<i>Total</i>	<i>W</i>	<i>C</i>
Orange	0	0	0
Osceola	1	1	0
Palm Beach	5	4	1
Pasco	1	0	1
Pinellas	6	5	1
Polk	13	9	4
Putnam	12	8	4
St. Johns	1	0	1
St. Lucie	0	0	0
Santa Rosa	1	1	0
Sarasota	3	2	1
Seminole	7	1	6
Sumter	6	2	4
Suwannee	15	6	9
Taylor	7	6	1
Union	2	2	0
Volusia	9	3	6
Wakulla	2	1	1
Walton	4	2	2
Washington	3	1	2

<i>Months, 1933</i>	<i>Total</i>	<i>W</i>	<i>C</i>
January	9	6	3
February	9	3	6
March	11	3	8
April	9	6	3
May	13	8	5
June	19	11	8
July	42	20	22
August	59	33	26
September	65	37	28
October	56	32	24
November	55	33	22
December	26	15	11

* State Hospital inmates included

Alabama and south through the central portion of the state as far as Polk County beyond which the incidence becomes much less significant.

In a country within the latitude of high malaria incidence there is a tendency to call all ill-defined fevers malaria, rendering difficult an accurate determination of morbidity, which can only be ascertained by spleen and blood smear surveys. In order to judge how nearly

our vital statistics represented the epidemicity or endemicity of malaria in the state, a spleen index of school children was taken in 1931 by Boyd and Stratman-Thomas in the 14 counties lying between the Apalachicola and Suwannee Rivers (*Thirty-third Annual Report—A Decade in Public Health*, Florida State Board of Health). Of those examined, the spleen index was 15.2 per cent among 2,502 Negroes,

and 34.2 per cent for 3,009 whites, or an average for both races of 25.6 per cent.

The area involved geologically is underlaid by limestone, and has numerous depressions forming sinks, lakes, and ponds of various sizes, the edges of which, and frequently much of the surface, are favorable to *Anopheles* breeding.

Further reference to the tables shows a greater mortality in certain counties such as Jefferson, Madison, Suwannee, Jackson, Leon, etc. The incidence is mainly rural. The urban rate is very low, although the disease is frequently contracted by persons who have been away from the cities at night.

2. Annual fluctuations are shown in Figure I, in which there is an apparent peak every 10 years with secondary intermediate peaks. Meteorological records show corresponding peaks in the spring and summer rainfall. The precipitation in the years 1924-1925 and early in 1926 was largely winter rain (see Boyd charts).

Aside from the rainfall and mosquito production it has been suggested that the fluctuation in incidence bears a relation to immunity acquired by a considerable portion of the population during the peak years.

Boyd has shown that persons who show clinical recovery from the acute attack without specific treatment were not susceptible to reinfection by the same strain of the parasite, and there is some indication of tolerance to a heterologous strain. How long this tolerance lasts is not known.

3. *Anopheles* of the state are: *A. quadrimaculatus*, *A. crucians*—two varieties (fresh and salt water), *A. punctipennis*, *A. atropos*, *A. walkeri*, *A. barberi*.

While the 6 foregoing species are all potential vectors, *quadrimaculatus* is by far the most important. This species is found over the state extending as far

south as Collier and Broward Counties and the northern third of Dade County, with greatly lessened production along the coasts. *Anophelines* of any species have not been found in numbers sufficient to be of sanitary importance, south of the east and west portion of the Tamiami Trail.

The distribution of species has an important bearing on epidemiology. The malaria incidence in our state coincides with the *A. quadrimaculatus* production, which is most accurately determined by the search for and the finding of adults. Observations on breeding made by dipping for larvae will not furnish the necessary knowledge concerning emergence of imagoes.

In so far as the Florida problem is concerned, the findings of Boyd in his work on the rearing of *Anopheles* (*quadrimaculatus*, *crucians*, etc.) in which he has found *quadrimaculatus* easily infectable with *P. vivax*, and *P. falciparum* together with the fact that *quadrimaculatus* is a known pond and lake breeder, lead us to believe that *quadrimaculatus* emergence is the main factor.

4. So far as the relative importance of the different species is concerned, *quadrimaculatus* is responsible for most of the malaria in the state. Other species, such as *crucians*, *punctipennis*, and *atropos*, are proven carriers but are regarded as epidemiologically unimportant. A factor of great importance is the habit, or tendency of *quadrimaculatus* to invade dwellings and sleeping quarters. Areas with heavy *crucians* production show relatively low case incidence of malaria, as determined by blood indices taken by Grifftts. For example, Bradford County at the time of the survey showed fairly heavy *crucians* production and infestation, but only 1.9 per cent of 1,643 school children were blood positive. Of those positive 37.5 per cent were E.A. (*P. falciparum*), 18.8 per cent benign

tertian, and 3.1 per cent were mixed infection. Of 6,161 school children examined during 1933, outside of the main endemic area, 5.4 per cent showed parasites on microscopic examination, a finding which seems to harmonize with the mortality statistics for the same area.

Leon County lying within the main endemic area, and having relatively high reported mortality, showed a blood smear index of 9.5 per cent among 655 children of which 87.1 per cent were *P. falciparum* (E.A.) and 4.9 per cent *P. vivax* (B.T.) and 1.6 per cent mixed, with 4.6 per cent species undetermined. Of the 9 schools examined the rate varied from 6.6 per cent to 41.7 per cent.

In Levy County 39 schools were examined, in 7 of which no positives were found, the remaining 32 varying between 2.7 per cent and 84.2 per cent. In the school showing 84.2 per cent positive, 81.2 per cent were E.A. infectious and 12.5 per cent B.T., while in 6.3 per cent the species were not determined.

During the past 2 years (1932-1934) 15,257 school children (mostly rural) have been examined (thick blood films) for malaria infection. This survey included the primary grades of 294 white and Negro schools in 16 counties in the northern section of the state. The rate of infection was found to be 6.1 per cent with 70.1 per cent *P. falciparum*, 21.7 per cent *P. vivax*, 0.2 per cent *P. malaria*, 1.7 per cent mixed *P. falciparum* and *P. vivax*, and 6.3 undetermined. As expected, the area of reported high mortality corresponds with a relatively high *P. falciparum* rate.

Fluctuations in precipitation, periods of drought followed by heavy rain, are followed by a somewhat corresponding fall and rise in the malaria morbidity and mortality curves (see Figure I).

The foregoing discussion has dealt briefly with a few of the biological and climatological principles which influence the appearance and continuation of malaria in a section of the southeastern United States, without reference to the influence of sanitary engineering or medical control measures.

Measles Epidemic Broke Record

MEASLES has broken a 21 year record. The number of cases reported each week has been higher than at any time since the U. S. Public Health Service began keeping records of this disease in 1912.

The epidemic has just begun to abate,

less than 30,000 cases being reported weekly now. At the peak of the epidemic, during the first week in April, 35,000 were reported by state health officials to the U. S. Public Health Service in Washington, D.C.—*Colorado Medicine* 31, 11:379 (Nov.), 1934.

A Study of Diphtheria Immunization in Preschool Children in Assumption Parish, La., 5 Year Period 1929-1933

P. M. PAYNE, M.D., F.A.P.H.A. (*Life Member*)

Director, Assumption Parish Health Unit, Napoleonville, La.

THE population of Assumption Parish is 15,990, and, according to the White House Conference reports, the preschool population of an average American city is 13 per cent of the population as a whole. Of course it is considered that the rural population is somewhat more prolific than the urban, therefore there should be a slightly larger percentage of preschool children in a rural community than in the city. On the other hand, I believe the infant mortality is somewhat greater in rural than urban populations, so there is after all not a great difference in the preschool population of the city and the country as a whole.

In looking over our birth records for the above period we find there have been 2,101 births in the 5 years, 1929-1933 inclusive, or an average of 420 births per year. Now, it will be seen that 13 per cent of 15,990 is 2,078 or very close to the average for city people, a little the rise of it in fact, 2,101, or 13.13 per cent.

<i>Population</i>	<i>Estimated Preschool Population</i>
15,990	13.13% of 15,990 equals 2,101

This tabulation shows that we are getting a very accurate birth reporting as the figures tally very closely with the statistical data on which the White House Conference report was founded.

A study of the diphtheria case inci-

dence shows the number of deaths occurring from that disease and the number of diphtheria immunizations completed in the parish since 1929.

Cases of Diphtheria, 1929-1933 inclusive

1929—4 cases, ages: 10 years (1), 6 yrs. (1), 3 yrs. (1), 1½ yr. (1).

Deaths, none.

1930—5 cases, ages: 9 years (1), 6 yrs. (1), 5 yrs. (2), 8 months (1).

Deaths, none.

1931—7 cases, ages: 8 years (2), 7 yrs. (1), 4 yrs. (2), 2 yrs. (2).

Deaths, 1, age under two years.

1932—5 cases, ages: 7 years (1), 6 yrs. (1), 4 yrs. (2), 26 yrs. adult (1).

Deaths, 1, age six years.

1933—2 cases, ages: 3 years (1), 2 yrs. (1).

Deaths, none.

We will pass over the immunization of some 4,000 or more school children in the parish before we were able to induce parents to permit us to immunize the younger children, from 6 months to 6 years, in which latter group diphtheria is most prevalent and most fatal.

In the entire period, 1929, 1930, 1931 we immunized but 117 children under 6 years of age, but as there occurred 7 cases of diphtheria in 1931, 5 of them under 5 years of age, with 1 death, a child of 1 year and 3 months, we determined to make a house to house canvass for preschool children, and the result was such as to stimulate us to

further effort in 1932. In 1932 we gave 601 children under 6 years of age two doses of toxoid and as there were no reactions of consequence it helped to induce parents to have their preschool children immunized, and the year 1933 showed a net 1,036 children under 6 years having had either the one dose, alum precipitated or the two dose toxoid.

From the foregoing it will be seen that up to the end of 1933 we had a total of 1,754 children under 6 years of age immunized against diphtheria, and the summer vacation (1934) will be devoted largely to a further round up of these children under 6 years, to the end that by January 1, 1935, we hope to have no less than 95 per cent, or more of the preschool children immunized. Every physician in the parish will be asked to coöperate in this work, and when one studies the matter closely it will be seen that after all, if the physicians immunized every child born in the parish, year by year, and that if they received \$1 per immunization for their fee, it would, after dividing the entire amount equally among the 9 physicians, give each but approximately \$40 per year, or if only half of them, which is more likely, were immunized it would be but about \$20 per year.

Diphtheria can, should, and must be prevented. I hold that each and every family physician should urge upon each parent at the time of the birth of a baby that the child should be immunized against both diphtheria and smallpox by the time the child is 1 year old, and that if the physician prefers to do it himself rather than delegate the matter to the health department that in a large majority of the cases the family will do as he says and pay the small fee required. Certainly, the immunization should be done, especially when we know that in these little ones is where the greatest danger lies.

With the narration of an interesting incident which occurred in one of the

cases of 1932, a death in a child 6 years old, we will bring this study to a close. It is as follows:

A child 6 years old was brought to one of the typhoid clinics and was given typhoid vaccine along with the parents. At a subsequent visit to the typhoid clinic another child, a baby about 1½ years old was brought but instead of giving this baby the typhoid vaccine we advised that they let us give it the diphtheria toxoid (two doses) which was done. The 6 year old was not given toxoid at the time on account of the typhoid vaccine.

A few months slipped away and the little 6 year old who had not been given the toxoid was taken sick and the family doctor suspected diphtheria and so advised us, asking if she had had toxoid, the mother stating that she had been given some "shots." On looking up her record it was found that she had not been given the toxoid, and a smear that had been sent to the Laboratory was reported "positive for diphtheria." She was given antitoxin, 20,000 units, but died within 24 hours from that time.

Meanwhile, the baby that had been given two doses of toxoid a few months before had been sleeping with the child who now had developed diphtheria, but no sign of the disease appeared in the little one, smears from its throat being negative, and while it had had every opportunity to develop the disease it was not in the slightest degree affected.

Of course, one case is not enough on which to base a conclusion that the child was protected by its two doses of toxoid, yet it is well worth relating and we are sorry indeed that we did not give the little 6 year old toxoid instead of the typhoid immunization.

Later. As of November 1, 1934, a total of 614 preschool children have been added to the above, all of them receiving one dose, alum precipitated toxoid, making 833 preschool children having had the one dose since last November, 1933. We are very glad to say that no reaction of any consequence has been heard of, no marked symptoms of any kind have been reported. Of these 614, a total of 530 are under 2 years, and 197 are under 1 year.

There is a signed statement by every

physician in the parish endorsing "the system of universal vaccination against infectious diseases as in effect at the present by our Local Health Unit."

I also represented my parish at the

annual meeting of the State Medical Society. This I tell you to show the manner in which I coöperate with the physicians of the parish. Only 1 case this year and no death.

Oregon to Systematize Health and Welfare

CREATION of a State Department of Public Welfare is recommended in the Report of the Governor's Interim Commission on Health and Welfare which has just been completed and is ready for free distribution. In the new Department would be placed all welfare activities while those relating to public health would be consolidated under the State Board of Health. The Commission recommends that this Board be provided sufficient funds fully to protect the citizens of Oregon.

The Public Welfare Department would have supervision over such matters as child welfare, institutional care, paroles and probations. The Oregon State Board of Public Welfare would consist of seven members, appointed by the Governor. One member would be from the faculty of the School of Social Work of the University of Oregon, and the State Medical Society and the State Bar Association would each recommend one. One term would end each year.

The Commission found that all divisions of the State Board of Health are undermanned, and that with the present financial provision it is impossible to carry on the work adequately. The increased demands for prevention of communicable disease requires the employment of an epidemiologist. Though much overworked, the staffs of the Hygienic Laboratory and the Sanitary Engineering Division have not been able to keep pace with their growing tasks. If the required funds are fur-

nished, it was pointed out, not only could the State Board of Health keep up with this work, but it could also do some intelligent planning to improve sanitary conditions in Oregon.

Recommendations included: That the State Board of Health license hospitals, maternity homes, public health laboratories, food handling establishments, shellfish production, overnight staying places and the industrial camps; fees to be large enough to cover adequate inspection. That venereal disease laws be revised, as the present statutes, besides being unenforceable, do not authorize examination for suspicious cases. The laboratory would be asked to establish free darkfield examination and blood tests for all persons unable to pay, regardless of whether they are indigent. That milk sanitation be transferred to the Health Department, which should coöperate with the State Milk Control Board in setting up and maintaining safeguards.

The Commission failed to reach an agreement on proposed consolidation of the healing arts professions and the personal service group, but suggested that, inasmuch as most of the regulations concern educational qualifications, the Department of Education should have supervision if there is a consolidation. It was added that sanitation should be supervised by the Board of Health, which should pass on all proposed sanitary rules and regulations.—*Weekly Bulletin*, Oregon State Board of Health, Portland, Ore., Dec. 25, 1934.

Control of the Processing of Canned Foods in California*

J. RUSSELL ESTY, PH.D.

*Director of National Cannery Association Western Branch
Laboratories, San Francisco, Calif.*

EXPERIENCE has shown that to preserve foods successfully by canning, all cans should be closed and processed under such conditions that in commercial shipment the ends will retain a concave position under every condition of temperature and altitude that is met. This involves canning the food cold and "exhausting" (heating the food before the container is hermetically sealed), canning the food hot ("precooking") and closing with or without an exhaust, or sealing with mechanical vacuum. To meet the above conditions also implies that the heat treatment given the product after the container is completely and permanently sealed ("process") should be sufficient to prevent the canned food undergoing any change on storage due to the growth of microorganisms surviving the process.

The soundness of canned foods does not necessarily indicate that the product is sterile, *i.e.*, completely devoid of viable organisms. To denote this in contrast to absolute sterility the qualified term "commercially sterile" is generally used by the canning industry. The presence of viable organisms in canned food is not considered significant if their environment is such as to inhibit their growth and multiplication. The ques-

tion is not whether viable organisms are present in the product, but rather is the food wholesome and merchantable?

To require that all canned foods should undergo no change due to microbial activity under any possible commercial storage conditions may be too rigid for general application, since spores of the group known as thermophiles (having an optimum temperature for growth above 100° F.) are generally much more resistant to heat than those of the mesophilic group such as *Cl. botulinum*. In fact, the resistance of many of the thermophilic group is so great that if even a few spores are present in a can it is often difficult to destroy them without rendering the product unmerchantable. In certain products susceptible to this type of spoilage, storage at temperatures above 100° F. for any length of time sometimes results in the development of a small proportion of swelled cans and/or flat sours, but this is not considered significant from a health standpoint.

Whether or not canned foods have been processed to render them commercially sterile in the aforementioned sense, it is universally conceded that they must be "safely" processed. This specifically refers to the effect on the health of the consumer. A "safe process" is one sufficient to destroy bacteria and their toxins that are harmful to health when ingested with food,

* Read before a Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

as well as spores of *Cl. botulinum* if the medium is suitable for their development. Extensive research has shown that in products having a pH below 4.5 the germination of *Cl. botulinum* spores is inhibited, and therefore such products can be safely processed in boiling water (212° F.). Practically all the fruits come in this category and the same applies for a very few other products with pH values up to 5.1. However, in general, from our present knowledge, if the food has a pH above 4.5, a process to be considered safe must be sufficient to destroy *Cl. botulinum* spores of maximum heat resistance.

As early as 1920 it was fully realized in California that to control botulism in commercially canned food scientifically established "safe" processes must be used in conjunction with a rigid and continuous inspection of the packing and processing procedures. Canning inspection in California started in 1920 with placing under the jurisdiction of the Bureau of Pure Food and Drugs of the California State Department of Health the sterilization of ripe olives in accordance with the specifications outlined by Dr. K. F. Meyer, Dr. E. C. Dickson and Dr. J. C. Geiger, members of the so-called "Botulism Commission," who were in charge of the investigation financed by the National Cannery Association, Cannery League of California, and California Olive Association.

This was followed on March 24, 1922, by the adoption by the California State Department of Health of a set of definite regulations relative to the processes and fill-in weights for commercially canned spinach.

In September, 1924, the control of the canning procedures was transferred from the Bureau of Pure Food and Drugs to a newly formed Division of Cannery Inspection, which was efficiently organized by M. P. Duffy. As consultant to the California State

Department of Health, Dr. K. F. Meyer was placed in charge of the scientific investigation to prepare process regulations and supervise the technical control of the packs.

On May 23, 1925, Act 428 was passed and approved by the governor, legally creating a Division of Cannery Inspection to regulate the conduct of canneries and provide rules for the proper sanitation of canning plants. This Act specified the inspection of agricultural products—primarily vegetables, and was amended in 1927 to include the supervision of the canning of fish and meat, so that today everyone in California who engages in the commercial canning of agricultural products, fish and fish products, meat and meat products, not subject to inspection by the Bureau of Animal Industry, is required to have a license from the State Department of Public Health, and the operation of the cannery is subject to the rules and regulations of the Cannery Inspection Service. It further provides for the licensing of retort operators who, before a permit is issued, must satisfactorily pass an examination on the fundamentals of steam sterilization and demonstrate their proficiency in the proper manipulation of retorts. Anyone desirous of packing a product liable to botulinum spoilage on which no process has been established must first have a process worked out that will meet the approval of the State Department of Health and then obtain a permit to pack.

The Cannery Inspection is administered by inspectors, who are state civil service employees under Mr. Duffy. Each cannery which packs products subject to inspection is visited daily during the packing season. Some of the important duties of the inspectors are to make a sanitary survey of the cannery; inspect raw material and equipment; calibrate the mercury and recording thermometers and pressure

gauges on the retort; supervise cannery procedures such as fill, exhaust, double seams, process and coding of containers; examine samples of the pack; and in the event of irregularities in canning or processing put the batch involved under restraint and submit samples to a qualified laboratory for examination. Production records are kept and temperature charts prepared as a control on the sterilization time and temperature. On the "Production Record" is noted the number of cans, code mark, time steam turned on, coming-up time, sterilizing time, readings of both mercury thermometers and pressure gauge, and any other pertinent information. Every effort is made to have available for control purposes a set of data giving the complete picture of the technical procedure required to render canned foods safe.

The coding of cans is an important provision in the regulations. By descriptive marks the inspector or food official can promptly identify a batch of questionable quality and remove it from the consumer's market without being forced to quarantine the seasonal output of a packing plant. In the case of a number of products, notably ripe olives, spinach, sardines and tuna, batch coding is specified; *i.e.*, all cans in a given retort are stamped with the same mark to differentiate them from those in other retorts. This is the smallest unit coded alike at the present time. Coding of other products may be restricted to segregating morning and afternoon packs.

For a number of products, such as artichokes and chili peppers, which in their natural condition are rendered unmerchantable by sterilizing processes, procedures are employed to acidify the product to a pH of at least 4.5.

Whereas the control of foods processed under pressure is by means of checking temperature charts, for acidified products titrations of periodic

samples of blanching and brining solutions are made. The fill of cans is also check-weighed daily, and at regular intervals electrometric pH determinations are made on samples of the finished product.

In all cases production records are carefully scrutinized. All food products packed under this inspection must be held by the canner until released by an inspector who, if the records show that all requirements have been met, issues a release order for shipment.

Lots that are restrained are set aside by the inspector, and representative samples are subjected to laboratory tests for sterility or, in the event of spoilage, to determine the cause of the abnormal condition. The number of cans submitted depends upon the nature of the defects or irregularities. When the laboratory findings are completed, and after due consideration of all the available data, the disposition of quarantined lots is decided by the Consulting Bacteriologist to the State Department. In the event of spoilage due to under-sterilization, all the cans involved are usually destroyed.

With this inspection service cases of under-sterilization in the products under surveillance have become rare. In fact, only a relatively insignificant number of the cans packed under inspection are placed under restraint for any cause, yet through this supervision an appreciable number of errors in processing is detected each year, which would otherwise pass unnoticed. Many of these defects are extremely slight and after investigation are found not to have affected the wholesomeness of the product.

At the present time the inspection service is supervising over 50 products, on which definite process regulations have been adopted by the California State Department of Health. The processes recommended for these products have been based upon a standardized procedure involving—

1. A study of the rate of penetration of heat in different sized containers under laboratory and factory conditions with variable filling-in weights.

2. Heat resistance of spoilage organisms, including *Cl. botulinum* spores.

3. Experimental packs of cans inoculated with a definite number of spores of suitable test organisms standardized to have a heat resistance comparable to that of *Cl. botulinum*. Recommended processes are finally obtained by applying a factor of safety to the heat treatment found to sterilize the product in the inoculated cans.

In this work the research laboratories connected with the canning industry have actively coöperated, and our present knowledge of processing non-acid foods is the combined experience accumulated during a period of over 15 years of continuous experimental work. The processes for non-acid foods officially used in California are those published in *N. C. A. Bulletin* 26-L revised, which were adopted by the Directors of the National Cannery Association and recommended for general use throughout the country. The collaborative studies are still in progress and as more experimental data become available the adequacy of processes for products liable to botulinum spoilage becomes more firmly established.

To indicate the scope of the laboratory in the technical control of the pack: from January 1, 1928, to July 2, 1934, samples from 370 restrained lots of vegetables and 237 specialty products have been examined. From each batch restrained a minimum of 24 cans, and frequently as many as several hundred, are tested. In addition to these a large number of samples of fish and fish products have been studied. The processing of 275 products, many of which were specialties of a more or less similar composition, has also been investigated. In some instances it was found impracticable to can safely certain products according to the methods contemplated, and packers being convinced of this abandoned the project.

However, in most cases proper processing methods were developed.

To determine whether or not the canned contents from restrained lots are "commercially sterile" no one procedure is applicable to all canned foods. Usually it is first necessary to incubate representative cans, and the time and temperature of incubation are more or less arbitrary, depending upon the types of organisms present and the particular class of product to be examined. In some cases it is necessary to use a rather long period because of slowness of growth of certain facultative thermophiles at temperatures below the optimum for development, or delayed germination of certain spore-bearing anaerobes such as *Cl. botulinum*. In relatively unfavorable mediums it might be necessary to store cans for an indefinite period. As a routine procedure to establish the commercial sterility of products with a pH above 4.5 cans should be incubated for at least 4 weeks at 98° F. For foods susceptible to thermophilic spoilage cans should be stored for at least 2 weeks at 98° F., followed by 10 days at 125° F. In the case of products with a pH below 4.5 it may be advisable to incubate at about 80° F. and also at 98° F. After the cans have been incubated for a sufficient time to permit spoilage organisms, if present, to develop, the contents in normal appearing cans are examined with respect to pH, general appearance and odor. If abnormality is detected, further tests may be necessary to confirm the observation. In the event spoilage is indicated from an abnormal external appearance of the can, every effort is made to ascertain the cause.

The technic of bacteriologically examining a canned product is relatively simple in so far as aseptically transferring material to enrichment mediums and other important details are concerned, but to interpret properly the results obtained requires careful analysis

and judgment based upon experience. Whether or not the organisms isolated are actually spoilage types; the significance of hydrogen springers or of thermophilic organisms; the absence of, or the failure to recover organisms in case of bacterial spoilage; the heat resistance of the spoilage organisms recovered; and a number of other questions are involved. Not infrequently one is unable to recover certain types of organisms if the cans are not cultured shortly after spoilage has developed, or even to see bacterial cells by the microscopic examination of stained or unstained preparations. This is particularly true of slow developing thermophiles that die and disintegrate about as rapidly as they develop. In acid products especially, dormant sporing organisms may develop on enrichment, but as growth is inhibited at the low pH their presence has no significance.

The bacteriological findings are only one important link in the chain of evidence necessary to be considered in a proper diagnosis of the cause of spoilage. These should be analyzed in connection with the condition of the can, factory operations, previous experience with the process, extent and amount of spoilage, *i.e.*, whether or not it is general, confined to one day or one line, or whether it is more or less spotted through a given period, and also whether it is confined to lots shipped to certain localities. The cans should be tested for obvious defects, such as perforations or faulty closure, and the interior examined for corrosion effects. In the case of bulged cans the gas in the headspace should be analyzed for this gives presumptive evidence as to whether or not the swelling is bacteriological or due to chemical action. For comparative purposes representative normal cans should be studied.

The possibility of an analyst making a wrong diagnosis, especially if all the facts are not available or are not con-

sidered, may be illustrated by the following example, which is typical of problems that are continually being met in dealing with spoiled canned foods.

An analyst receives swelled cans of pears for examination. He cultures these cans according to a certain technic on certain media and incubates the cultures at a certain temperature for so many days, during which time they remain sterile. The acidity of the product is abnormally high (low pH). Nothing definite is observed in the stained preparations examined microscopically. The analyst, with such meager information, is naturally puzzled regarding the cause of the swells.

In dealing with such a case there are many possibilities to be considered. First, is the gas hydrogen or carbon dioxide or a mixture of both? If hydrogen, is this due (1) to chemical action of the product with the container, or (2) to a hydrogen-producing bacterium, or (3) to flat sour spoilage with subsequent hydrogen production through chemical action due to the lowering of the pH of the fruit juice, or (4) to bacterial growth in the fruit before cooking, with lowering of pH and subsequent development of hydrogen? Data on the type and extent of spoilage should also be considered. If both hydrogen and carbon dioxide are present, is the spoilage due to under-sterilization or to leaky seams? Expert judgment as to the condition of the double seams and a knowledge of the canning and processing operations are required to determine the significance of these factors.

Another condition that a food bacteriologist may encounter in his study of spoiled canned foods is the presence of non-heat-resistant organisms in vegetable and meat products in cans having satisfactory seams, or of acid producing organisms in swelled cans. Is the spoilage due to under-sterilization or leakage of bacteria subsequent to

processing? In such cases it is impossible from the bacteriological findings alone to reach a definite conclusion; whereas with a knowledge of canning procedures the trouble is more readily explained.

The subject of spoilage in canned foods is a very complex one, and this becomes more apparent the longer one works in this field. In view of the great number of canned foods, varying in their chemical composition and acidity (pH ranging from below 3.0 to

above 8.0), and the many types of organisms that can grow and produce changes, the bacteriological examination of every food, and often of a given lot of a particular product, has to be considered as a separate problem to be studied in the light of the whole previous history of the case. With the ever changing technic of canning procedures, the problems become so complex that only experienced analysts in constant contact with actual canning operations can be expected to solve them.

Smallpox Diminishing

THERE was less smallpox in the United States and Canada in 1933 than ever before, and if we may judge by the records for 7 months of 1934, there will be a further drop this year, in the opinion of the *Statistical Bulletin* of the Metropolitan Life Insurance Company. These 7 months not only show a new low record for the period, but report less than one-tenth the number of only 4 years ago. The fight on smallpox seems nearly won.

Some states, however, still have a bad record, for 4,589, or 75 per cent, of the 6,122 cases reported by 46 states occurred in 12 states that contain only one-fifth of the country's population.* Popular sentiment in these states is against vaccination.

Contrast with these, 10 other states † and the District of Columbia, along the Atlantic seaboard, which had only 4 cases of smallpox in 1933, and only 809 in the last three years.

* The 12 states with high smallpox records are California, Colorado, Idaho, Oregon, Iowa, Montana, Nevada, Oklahoma, Texas, Utah, Washington, and Wisconsin.

† The 10 states with low records are Delaware, Florida, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, and Rhode Island.

There is no reason to doubt that this fine record could be duplicated by the rest of the country.

In continental Europe, where compulsory vaccination is generally accepted and practised, smallpox has practically disappeared from all of the countries, excepting Russia and the Iberian Peninsula. In 1931 there was not a single case of smallpox reported in Belgium, Bulgaria, Scotland, Germany, Italy, Luxembourg, Norway, Sweden, Switzerland, and Yugoslavia. Only 1 case each was reported in the Netherlands and Latvia, 5 in Finland, 12 in Greece, 13 in Roumania, and 14 in Poland. France, with a population of over 40 millions, reported only 162 cases.

In England and Wales, on the contrary, where since 1907 "conscientious objectors" have been exempt from compliance with the vaccination laws, the incidence of smallpox has reached such proportions that in 1931 there were reported 5,665 cases, a number far in excess of the total number of cases reported by the whole of continental Europe, excluding Russia.—*New York State J. Med.*, 34, 23:1021 (Dec. 1), 1934.

Experiments on the Purification of Creamery and Packing-House Wastes*

MAX LEVINE, PH.D., F.A.P.H.A.

*Professor of Bacteriology, and Bacteriologist, Engineering Experiment
Station Iowa State College, Ames, Iowa*

IN the course of some small scale experiments on the purification of creamery and packing-house wastes, several observations were made which might be of interest and possibly of practical significance to those engaged with the problems of waste disposal. The time available does not permit elaboration. The various items will be but briefly considered.

EXPERIMENTS WITH CREAMERY WASTES

Several observations on the effect of bottom ventilation and dosing cycle on purification are considered particularly interesting.

Effect of Bottom Ventilation—Skim milk solutions were applied to a small filter 2' square and 6' deep, at a rate of 800,000 gal. per acre per day for about 14 hr. daily.† The filter was constructed of metal and provided with a hopper bottom which terminated in a water seal trap (Figure I). This hopper bottom was provided with air ports so that the filter could be operated either with or without bottom ventilation. The filling material consisted of coarse washed cinders, or rather clinkers, retained on a screen with $\frac{1}{2}$ "

openings. The results are detailed in a recent Bulletin¹ of restricted circulation. Figure II, taken from that publication, shows clearly that a very high degree of purification was effected when the air ports were open, permitting adequate and thorough bottom ventilation (wastes of about 1,000 p.p.m. B.O.D. were reduced to effluents of about 10 p.p.m. B.O.D.), but that closing these ports resulted in very rapid deterioration of the purifying efficiency of the apparatus. With bottom ventilation eliminated, the filter clogged badly, and this condition was not remedied by merely opening the air ports; the clogging material had to be washed out to effect relief.

Effect of Dosing Cycle—One filter as above, and another filled with $1\frac{1}{2}$ " to $3\frac{1}{2}$ " rock in place of the cinders, but with the hopper bottoms removed, were dosed simultaneously with a skim milk solution at a constant rate of about 600,000 gal. per acre per day, but the dosing cycles were varied in the range of approximately $2\frac{1}{2}$ min. to 22 min. The purifications effected as indicated by B.O.D. reductions are shown in Table I.

It appears that the dosing cycle had no significant influence on the purification effected by the cinders but that with the coarser rock as a filling material, the short dosing cycle was distinctly preferable, reductions of 90.5

* Read at a Joint Session of the Laboratory and Public Health Engineering Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

† Designed by H. N. Jenks, who was associated as a consultant on some of the experiments at Iowa State College.

TABLE I

EFFECT OF DOSING CYCLE AND NATURE OF FILLING MATERIAL ON PURIFICATION OF CREAMERY WASTES

Dosing Cycle		2½ Min.	5-7 Min.	10-12 Min.	20-22 Min.
		B.O.D. (5 days 20° C.)			
Applied Waste		1,010 (± 113)	1,020 (± 40)	975 (± 200)	1,030 (± 100)
Eff.	Cinder	4 (± 0.5)	5 (± 2)	10 (± 8)	8 (± 4)
	Rock	96 (± 23)	94 (± 27)	127 (± 31)	227 (± 54)
Per cent Reduction	Cinder	99.6	99.5	99.0	99.2
	Rock	90.5	90.7	87.0	78.0

per cent, 87.0 per cent and 78.0 per cent being obtained with the 2½ min., 10-12 min. and 20-22 min. dosing cycles respectively.

It was also observed that whereas the dosing cycle had no appreciable effect on the fluctuation in the rate of run-off of the effluent from the cinder filter, the

rate of run-off from the coarse rock filter was very markedly affected as is shown in Figure III. The run-off cycle is very significant from the standpoint of sampling and it probably also affects the efficiency of post-filtration sedimentation. Thus, effluents with B.O.D.'s as low as 24, or as high as

TABLE II

PURIFICATION OF PICKLE BRINE BY EXPERIMENTAL STREAM FLOW ACTIVATED SLUDGE PLANT

Waste	8% Pickle Brine			20% Pickle Brine		
	Raw (0)	6 Hr.	22 Hr.	Raw (0)	6 Hr.	22 Hr.
Org. N.	112	16	29	262	177	104
NH ₃	16	38	22	26	87	128
NO ₂	5	2.5	2.2	12	5.5	6.0
NO ₃	57	1.5	1.4	124	11.3	6.8
O ₂ Cons.	1,150	101	93	3,080	610	236
O ₂ Dem.	1,190	97	31	2,720	770	140
pH	6.9	7.7	7.9	6.5	7.4	7.6
NaCl	9,380	—	—	20,265	—	—

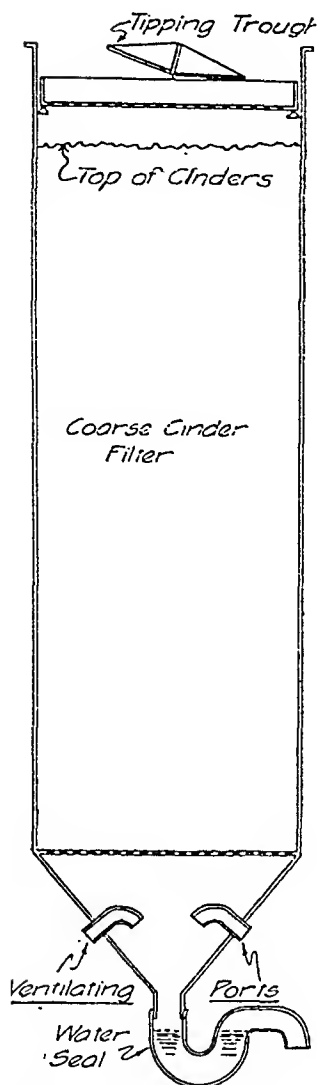


FIGURE I—Cross-section of the experimental laboratory filter

428 could be obtained, depending on the point in the effluent cycle at which the sample was collected. In the experiments reported here (which are considered of a preliminary nature and are being studied further) this sampling error was eliminated by including in the sample all of the effluent during a complete cycle.

EXPERIMENTS WITH PACKING-HOUSE WASTES

Some studies were made on a small scale to ascertain: (1) whether the high

salt content precluded the use of the activated sludge process for treating packing-house wastes; (2) the effect of aeration of a deep trickling filter; and (3) the feasibility of employing double filtration (the first filter being decloggable by back-washing) for purification of packing-house wastes.

Observations with the Activated Sludge Process—An activated sludge plant was in existence at Mason City, Iowa, for treatment of packing-house wastes. The purification effected was not satisfactory (45–55 per cent) and rumors were current that the poor results were due to the salt (1,200 to 1,500 p.p.m.) present as sodium chloride. This conception was so prevalent that it was felt necessary to demonstrate that this was not the cause of the difficulty.

An activated sludge was prepared by circulation of packing-house waste in an experimental stream-flow aeration device (Figure IV) which has been previously described by Jenks and Levine.² The tank was then charged with an 8 per cent and 20 per cent pickle brine. The results are shown in Table II, from which it is apparent that the activated sludge process functioned effectively even in the presence of 20,000 p.p.m. NaCl when operated on a fill and draw basis. The poor efficiency of the continuous flow activated sludge plant previously referred to could not be due to the salt content of the waste which was only about 1,200 p.p.m., and is attributed to the very excessive fluctuations in the concentration of the wastes reaching the purification plant.

Purification by Double Filtration (Aerated Filter)—Packing-house waste which had been settled for about 1½ hr. was applied to a filter 3½' square, and 10' deep at a rate of 7×10^6 gal. per acre per day for a period of 6 months. The filling material consisted of 1 to 2½" red granite. The filter

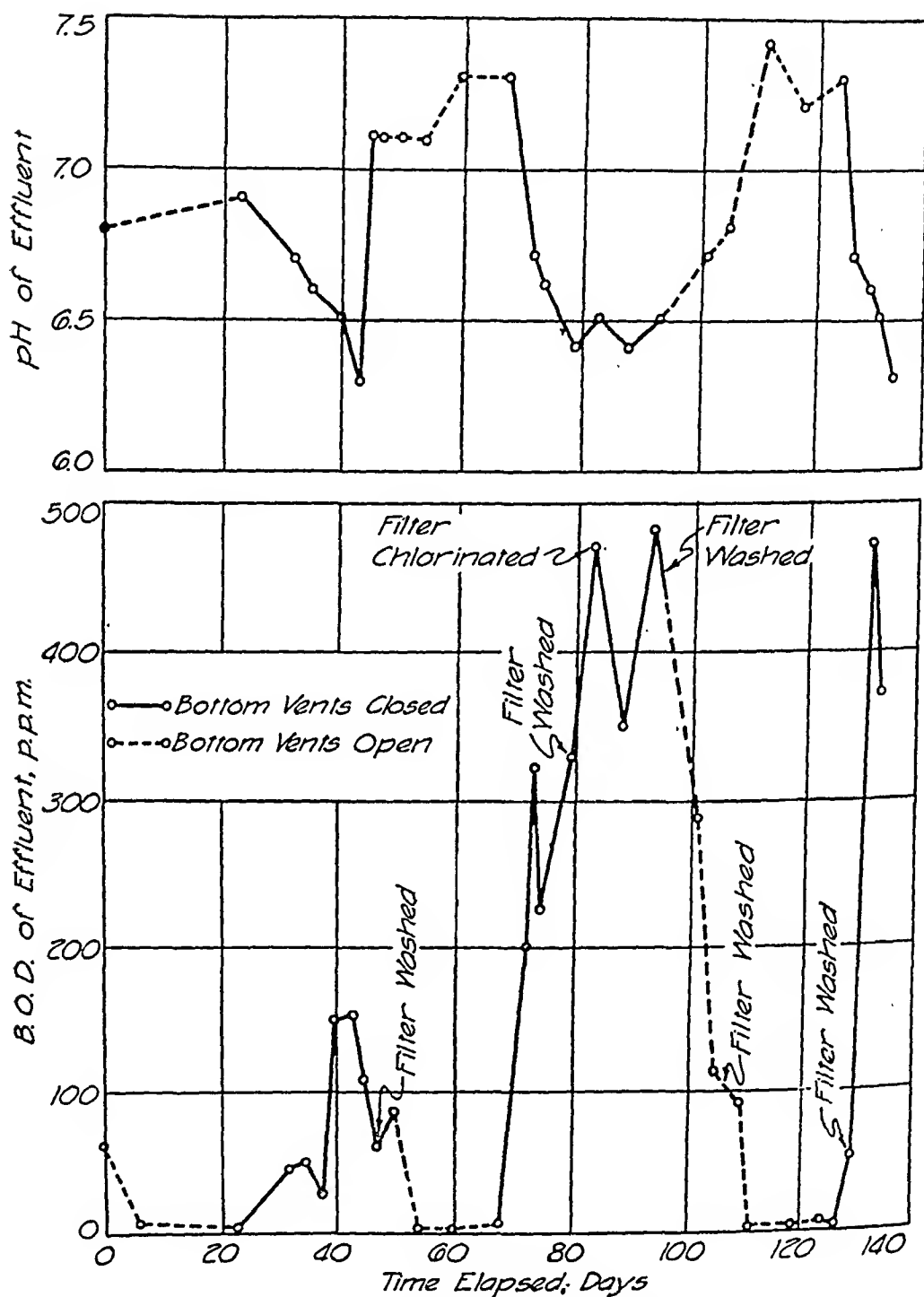


FIGURE II—Effect of bottom ventilation of trickling filter B on the biochemical oxygen demand and reaction of the effluent

was constantly aerated through a perforated grid on its bottom.

The purification effected was very satisfactory (about 40 per cent B.O.D.) considering the high rate of application,

and there was no evidence of serious clogging. The effluent from this aerated filter was settled in a small Imhoff tank and then applied to a cinder or coarse gravel filter, 3' square and 8' deep, at

a rate of 3×10^6 gal. per acre per day. The results are summarized in Table III.

It may be seen that a very high degree of purification was effected. Filtration at 7×10^6 on 10' of aerated coarse rock effected a reduction of

40.9 per cent in B.O.D. and 54 per cent in organic nitrogen, but the ammonia increased considerably. Sedimentation of this effluent increased the B.O.D. removal to 49.9 per cent and the organic nitrogen removal to 71 per

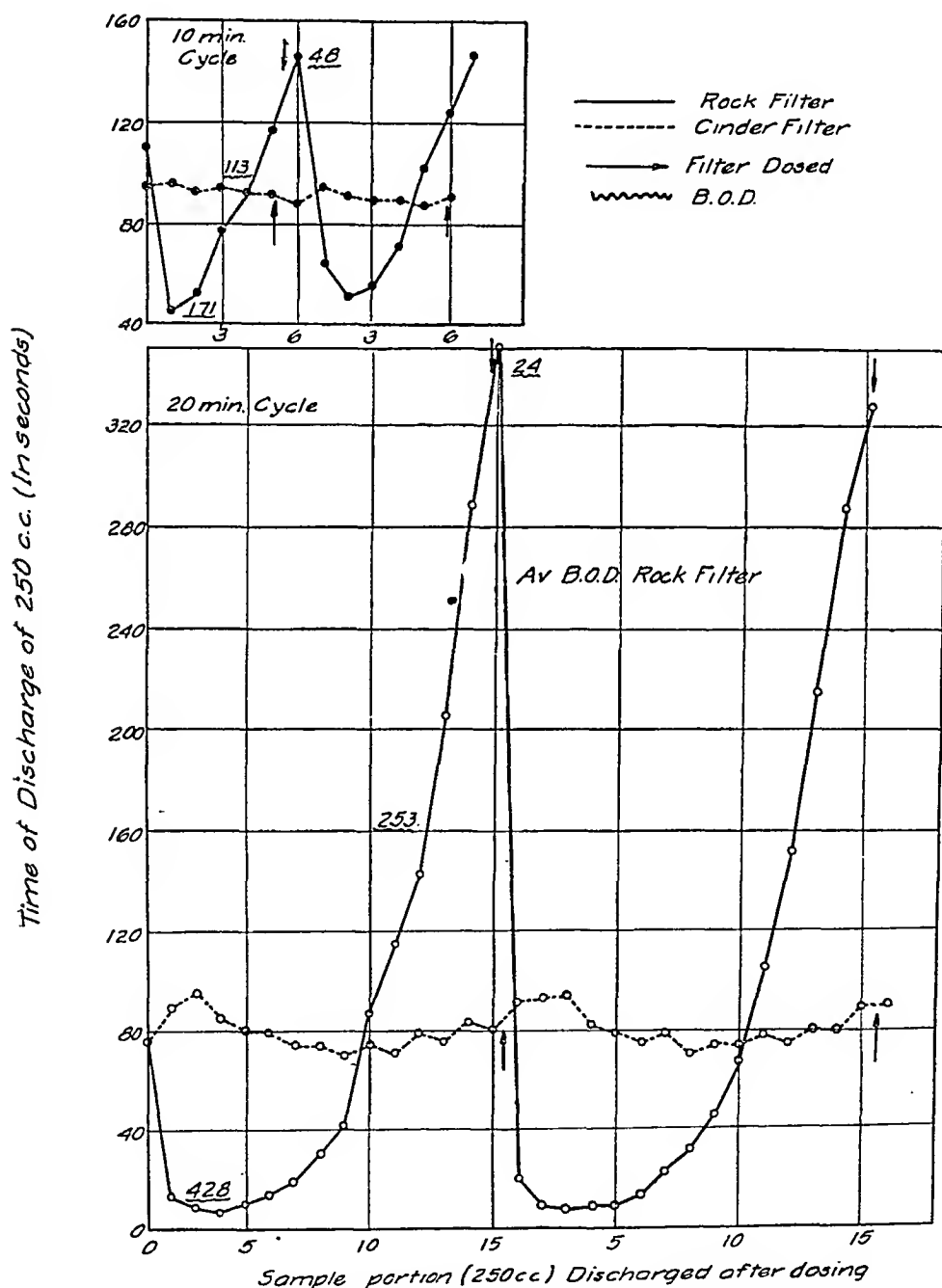


FIGURE III—Effect of dosing cycle and nature of filling material on rate of discharge of effluent

TABLE III
PURIFICATION OF PACKING-HOUSE WASTE BY DOUBLE FILTRATION
(AERATED FILTER SERIES)

	(1)	(2)	(3)	(4)	(5)
	Applied Waste	Eff. from aerated 10 ft. filter at 7×10^6 gal. per acre per day	Settled * Eff. from (2)	Eff. from 8 ft. cinders at 3×10^6 gal. per acre per day	Eff. from 8 ft. coarse gravel at 3×10^6 gal. per acre per day
Org. N.	115	52.5	33.2	5.8	10.9
NH ₃	35	2.0	83.0	19.4	31.6
NO ₂	0.6	0.58	0.06	1.7	1.5
NO ₃	2.4	0.95	0.8	40.1	44.4
O ₂ Cons.	334	246	185	79	109
pH	7.1	7.5	7.6	7.7	7.7
O ₂ Dem.	929 (± 200)	549 (± 156)	465 (± 101)	29 (± 17)	57 (± 27)
No. of Sample	56	55	37	40	40
Over-all per cent reduction					
Org. N.		54.3	71.0	95.0	90.5
NH ₃		†	†	44.6	10
O ₂ Cons.		32.2	44.6	76.3	69.7
O ₂ Dem.		40.9	49.9	96.8	93.9

* Constitutes waste applied to cinder and gravel filters.

† Increase.

cent. Further treatment of this partially purified and settled waste by application onto cinders and gravel filters at 3×10^6 gal. per acre per day effected over-all reduction in B.O.D. of 96.8 per cent and 93.9 per cent respectively, and correspondingly high reduction in organic nitrogen (95.0 and 90.5 per cent). Nitrification was particularly good, 40 to 44 p.p.m. of nitrates being present in the effluents which consequently showed stabilities of over 90 per cent.

Purification by Double Filtration (Washable Filter)—A settled packing-house waste was applied to a shallow cinder filter, 3' square and 3' deep, at a rate of 4×10^6 m. gal. per acre per day, and the effluent, after resettling in an Imhoff tank, was applied to a filter

3' square and 8' deep, containing 1 to 3" dolomite, at a rate of 3×10^6 gal. per acre per day. The primary or cinder filter was so constructed that it could be washed free of clogging materials by back washing with water and agitation with air.

The results, for a period of about 3 months, are shown in Table IV. The waste during the experiments (March to June) was not as strong as that employed in the aerated filter studies. The purification effected was very satisfactory.

Filtration through 3' of cinders at 4×10^6 gal. per acre per day effected reduction of 56.5 per cent in B.O.D. and 34.7 organic nitrogen. These reductions were increased to 59.2 per cent and 51.1 per cent for B.O.D. and

organic nitrogen respectively, by sedimentation in a small Imhoff tank. Further treatment of the effluent from the Imhoff tank on an 8' dolomite filter, 1"-3" filling material, at 3×10^6 gal. per acre per day effected over-all reduction of 93.2 per cent in B.O.D. and 83.7 per cent organic nitrogen. Nitrification was very good, the effluents contained an average of 20.8 p.p.m. of nitrates and were stable (relative stability over 90 per cent).

Purification of Packing-House Wastes by Double Filtration—In 1929 a plant designed on the principle of the washable filter just described was put into operation at the Jacob E. Decker Packing Company at Mason City, Iowa. It consists of a modified Dorr settling tank with $1\frac{1}{2}$ to 2 hr. sedimentation, followed by treatment on $\frac{1}{4}$ acre of a shallow washable filter, at about 3×10^6 to 4×10^6 gal. per acre per day, and the effluent from this filter, after settling for $1\frac{1}{2}$ to 2 hr., is applied to a dolomite filter $\frac{1}{2}$ acre in area and 8' deep at 1.5×10^6 to 2×10^6 gal. per acre per day, the filter effluent being subjected to final sedimentation in a

modified Dorr clarifier before discharge into the stream. The primary washable filter which at first contained cinders, was later changed to $\frac{1}{2}$ " to 1" dolomite. The secondary, deep 8' filter, was filled with 1" to 3" dolomite.

The plant was designed to handle 750,000 gal. per day, with a maximum rate of flow of 1,000,000 gal. per day through the purification plant, during a part of the day, and it was anticipated that with a maximum initial B.O.D. of 1,000 p.p.m. a reduction of 85 to 90 per cent would be obtained, *i.e.*, the maximum reduction anticipated, was 5,300 to 5,600 lb. B.O.D. per day.

The results for the year 1933 are summarized in Table V. The effluent from the first settling tank, which is applied to the washable filter, is referred to as the "primary clarifier"; the effluent from the washable filter after settling, which constitutes the waste applied to the deep filter, as the "intermediate clarifier"; and the effluent from the final filter, after settling, as the "final clarifier" in Table V.

The average volume of sewage treated during the year 1933 was about

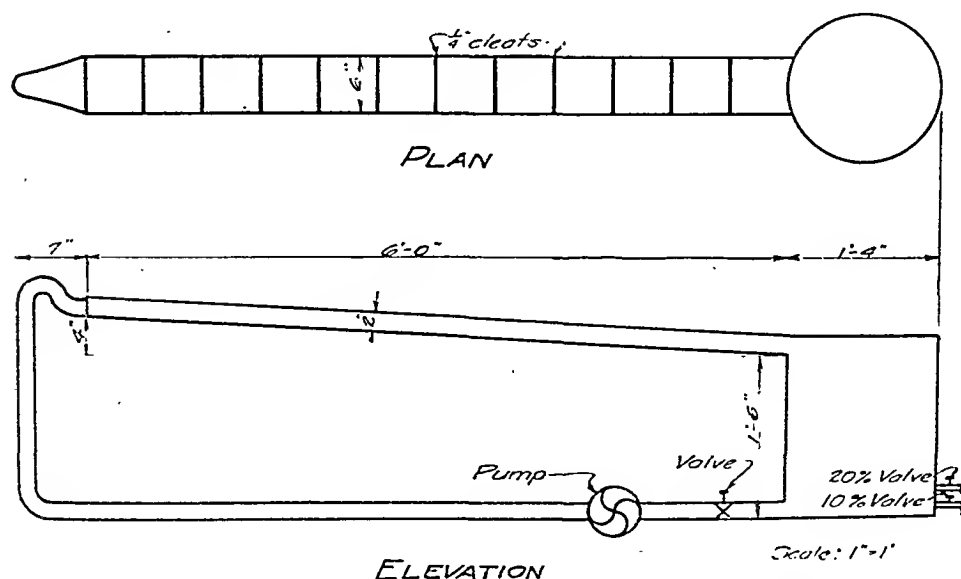


FIGURE IV—Diagrammatic sketch of experimental stream flow aeration unit (after Jenks & Levine)

TABLE IV
PURIFICATION OF PACKING-HOUSE WASTE BY DOUBLE FILTRATION
(WASHABLE FILTER SERIES)

	(1)	(2)	(3)	(4)
	Applied Waste	Eff. from 3 ft. washable filter at 4 x 10 ⁶ gal. per acre per day	Settled Eff. from (2) *	Eff. from 8 ft. Dolomite at 3 x 10 ⁶ gal. per acre per day
Org. N.	43	28	21	7
NH ₃	28	40	44	17
NO ₂	0.3	0.2	0.0	2.2
NO ₃	1.5	0.85	0.6	20.8
O ₂ Cons.	195	128	107	57
pH	7.2	7.4	7.5	7.8
O ₂ Dem.	632 (⁺¹⁴² ₋)	274 (⁺¹⁰⁰ ₋)	258 (⁺¹⁰⁰ ₋)	44 (⁺²⁰ ₋)
No. of Sample	38	38	38	38

Over-all per cent reduction

Org. N.	—	34.7	51.1	83.7
NH ₃	—	†	†	39.1
O ₂ Cons.	—	34.1	45.1	70.7
O ₂ Dem.	—	56.5	59.2	93.2

* Constitutes waste applied to Dolomite (1 to 3") filter.

† Increase.

TABLE V
PURIFICATION OF PACKING-HOUSE WASTE AT MASON CITY, IOWA,
FOR THE YEAR, 1933.

	Raw Waste	Primary Clarifier	Intermediate Clarifier	Final Clarifier
Org. N.	150.4	97.9	54.3	12
NH ₃	46.5	63	81.3	35
NO ₂	—	—	—	1.6
NO ₃	—	—	—	9.8
O ₂ Cons.	521	359	256	142
O ₂ Dem.	1,437 (⁺⁴⁰² ₋)	1,020 (⁺²⁵³ ₋)	534 (⁺²³² ₋)	82 (⁺⁸¹ ₋)
No. of samples for B. O. D.	201	197	198	202

Over-all per cent reduction

Org. N.	—	34.7	63.8	92
NH ₃	—	—	—	24.7
O ₂ Cons.	—	31.1	58.6	72.7
O ₂ Dem.	—	29.0	62.8	94.3

600,000 gal. per day and the maximum volume 900,000 gal. per day. The average B.O.D. of the applied waste was $1,437 \pm 404$, the minimum for any one day 650, and the maximum 3,850. The purification effected by the various portions of the sewage treatment plant are also shown in Table V. Over-all reduction of 92 per cent organic nitrogen, only 29.7 per cent ammonia, 72.7 per cent oxygen consumed and 94.3 per cent oxygen demand were effected.

A more detailed idea of the workings of the various portions of the plant may be obtained by examining Figures V and VI, from which it will be noted that 50 per cent of the applied wastes had B.O.D.'s of between 700 and 1,400 p.p.m., while 50 per cent of the final effluents showed B.O.D.'s between about 20 and 56 p.p.m. The next higher 30

per cent of the samples of applied wastes had B.O.D.'s between 1,400 and 1,800 p.p.m. and the effluents between 56 and 110 p.p.m. B.O.D. Finally, 20 per cent of the raw wastes had B.O.D.'s of over 1,800 (2 per cent over 2,500) and 20 per cent of the effluents were over 110 p.p.m. (2 per cent over 250 p.p.m.) B.O.D.

The per cent reduction of B.O.D. is a reasonable figure for comparing the efficiency of the various portions of the plant on any given day, or for different days, if the volume and concentration of applied wastes are constant, but in view of the fluctuation in volume of waste treated from day to day, analysis on the basis of the total pounds of B.O.D. removed is probably a more dependable measure of the plant efficiency. An analysis of the efficiency of

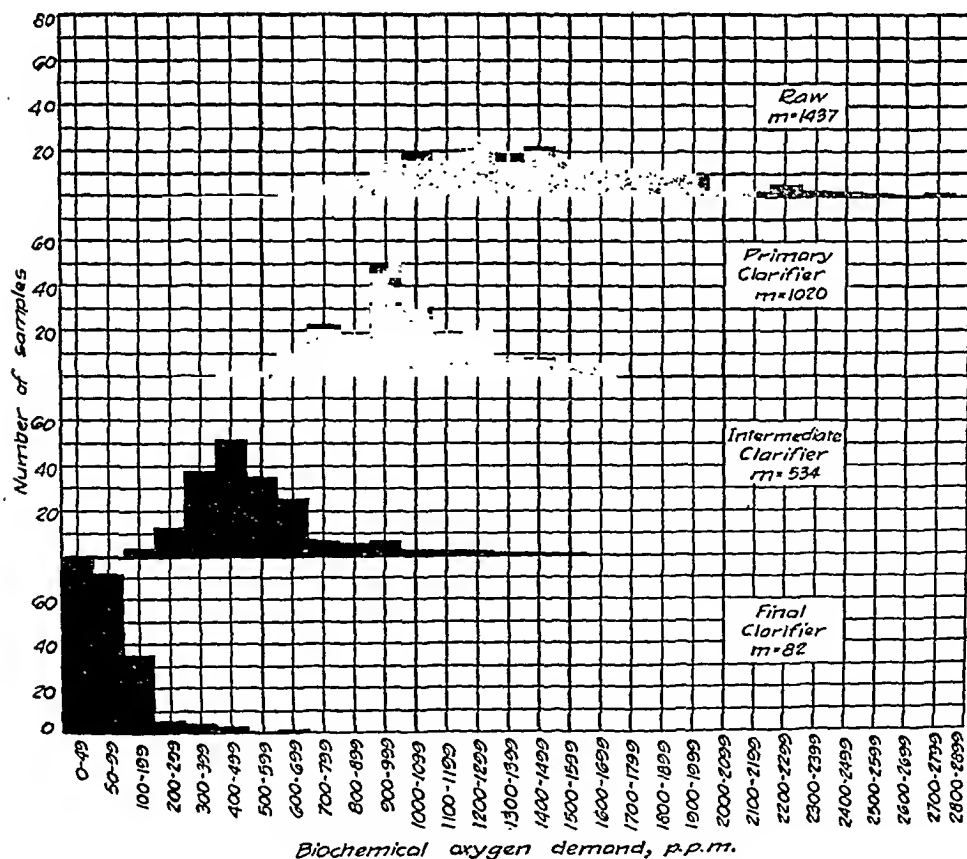


FIGURE V—Purification of packing-house wastes

TABLE VI

REMOVAL OF B.O.D. (IN POUNDS) BY PACKING-HOUSE WASTE PURIFICATION
PLANT AT MASON CITY, IOWA, 1933

	Raw	Primary clarifier effluent	Intermediate clarifier effluent	Final clarifier effluent
B.O.D. (in pounds) (average for year)				
Present	6,880	4,335	2,347	328
Reduction by unit	—	2,545	1,988	2,019
Over-all reduction	—	2,545	4,533	6,552
Per cent reduction				
By unit	—	37	45.9	81.8
Over-all	—	37	65.8	95.2

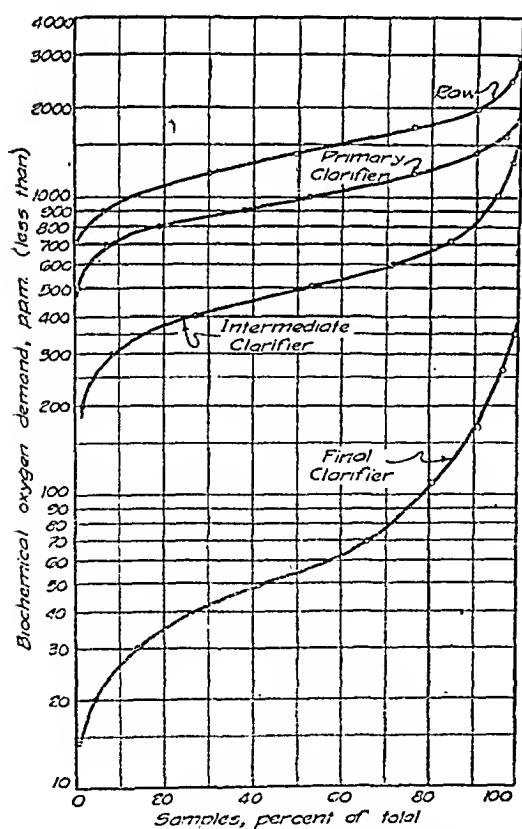


FIGURE VI—Purification of packing-house wastes by settling and filtration

the plant on this basis is shown in Table VI.

In short, sedimentation for about $1\frac{1}{2}$ hr. effected a reduction of 37 per cent B.O.D. Treatment of the effluent on 3' of rock at an average rate of 2.4×10^6 gal. per acre per day followed by settling, reduced the B.O.D. of the applied effluent by 45.9 per cent or an over-all reduction of 65.8 per cent. Finally, application of this settled shallow filter effluent on 8' of coarse dolomite at an average rate of 1.2×10^6 gal. per acre per day and settling resulted in a further reduction of 81.8 per cent in B.O.D. of the applied waste or an over-all reduction of 95.2 per cent.

The over-all removal of B.O.D. by filtering and sedimentation of filter effluents (exclusive of primary sedimentation of the raw waste before application to the filters), was 633 lb. per acre-foot.

SUMMARY

Data are presented on some experi-

ments in the treatment of creamery and packing-house wastes and results of a full size plant for treating packing-house wastes, which indicate that the full capacities of trickling filters are not

generally utilized in treatment of domestic sewage.

REFERENCES

1. *Bull. 116*, Iowa Engineering Experiment Station.
2. *Eng. News Rec.*, 100:808-813, 1928.

DISCUSSION

CHARLES GILMAN HYDE, F.A.P.H.A.

Professor of Sanitary Engineering, University of California, Berkeley, Calif.

IN this paper the author has made a valuable contribution to the art of industrial wastes treatment. The paper contains not only a wealth of information but much suggestive material which offers food for thought. For instance, the effect of excessive and greatly varying loads upon activated sludge plants is referred to and indicates a possible explanation of difficulties experienced at times with that type of plant.

At least 4 very interesting phases of the general subject are presented:

1. The basic laboratory experiments covering two distinctly different methods of treatment of very strong industrial wastes: (a) the activated sludge process on the so-called stream-flow principle; (b) trickling filtration.

2. The model plant experiments utilizing two-stage trickling filtration and developing apparently authentic results.

3. The application of the procedure of the model plant to full scale in treating a relatively large volume of wastes of extreme variability in composition and of extraordinary strength or concentration.

4. The operation of the practical, full scale plant through a 5 year period and the presentation of the results obtained during the last or 5th complete year of operation.

Diagrams V and VI are of particular interest as exhibiting methods of exposition of analytical results. Diagram VI is especially noteworthy in that it shows at a glance the performance of the plant with reference to B.O.D. removal. The spread of the analytical determinations representing the performance of each stage of the treatment process is graphically shown to great advantage.

To an increasing extent industrial wastes are attracting the attention of sanitary engineers and laboratory technicians both from the standpoint of possible salvage and that of treatment to prevent excessive stream pollution and nuisances.

It is refreshing to have, as in this paper, a review of the results actually achieved by a full scale plant which has been operated through a period of several years and not merely one which has just been designed with the fervent hope of successful accomplishments. Engineering literature is replete with prophecies but too frequently silent or arid with respect to actual realizations and accomplishments.

Unfortunately, where biological agencies play a significant part in the ultimate results, the "model law" is not always apparent; and perhaps never to the extent that it is in the field of structural and hydraulic experimentation. For this reason, while "bottle" experiments have their indisputable place, the results secured therewith cannot be applied with assurance to full scale plants. Batch treatment is not to be compared with variable flow treatment. The author wisely supplemented bottle or batch experiments with flow experiments through a model plant of such size as to yield reasonably authentic results which could be extrapolated to the conditions of a full scale plant. This procedure is particularly desirable,

even necessary, when the method of treatment is unique, as in the case in question.

Standard practice in trickling filtration makes use of coarse grained aggregates rather than fine grained materials such as sand or cinders. The author has clearly shown the advantage of short dosing periods or cycles where coarse rock is employed in trickling filters, and especially when these are subjected to heavy and widely varying loads. The importance of bottom ventilation under such conditions has been clearly demonstrated.

The author is to be congratulated in

that he has developed a type of treatment applicable to enormously variable and extremely heavy loadings and one which, on the basis of B.O.D. removal, seems to be relatively cheap in installation and operating costs.

The author does not describe the design and construction features of the working plant whose operating results he so interestingly and instructively sets forth. It is very desirable that this be done and it is hoped that in the near future he, perhaps in collaboration with the designing engineers, will prepare an adequate description of that plant from the design and construction standpoints.

Health Statistics of New York

INFANT mortality, tuberculosis deaths and cases, and other health statistics are now compiled regularly for each health area in the City of New York by the Health Department. Various welfare organizations are at work collecting information concerning juvenile delinquency, services rendered by philanthropic agencies, residence of patients discharged from hospitals, and other data, all on the basis of residence in health areas.

In addition to the statistics given in *Heads of Families*, and other volumes in the series of studies of neighborhood statistics, information is available in the Research Bureau of the Welfare Council of New York City, 122 East 22 Street,

New York, on the smaller divisions which make up the health areas. These smaller divisions are census tracts and for them the U. S. Census Bureau compiles the statistics which form the source material of the Welfare Council studies. Each census tract is approximately 40 acres in area and there are some 3,400 tracts in New York City.

Other studies of neighborhood statistics which contain information regarding every health area in the five boroughs of New York are *Population in Health Areas*, which gives the population by age groups and by color, nativity, parentage, and sex, and *Homes by Tenure and Value or Monthly Rental*.

A Nutritional Survey of Forty-five Hundred Children on Relief*

J. C. GEIGER, M.D., F.A.P.H.A., AND PAUL S. BARRETT, M.D.

*Director of Public Health; and Director, Bureau of Child Hygiene,
Department of Public Health, San Francisco, Calif.*

LESS than a year ago the Children's Bureau of Washington, D.C., called a conference to consider the reported increase in malnutrition due to the depression.

This reported increase was based on studies from New York City, Massachusetts rural regions, and a Philadelphia relief group, notwithstanding the fact that a number of public health workers had called attention to the lack of objective standards of nutrition. Others had emphasized the fact that current morbidity statistics did not point to widespread emergency and the writer in a letter dated September 27, 1933, addressed to a member of the Child Health Recovery Committee wrote:

In conclusion, I might say that it is the opinion of all the workers in the Department that the nutrition of San Francisco children has not materially suffered, and I even could go so far as to say that never before have the families on relief been under such competent medical supervision. Malnutrition may exist in the isolated case of a child whose family is too proud to ask for relief, or in that group of transients whose movements are difficult to check and who are not under adequate supervision, and who are part of the vexatious nonresident problem.

On March 1, 1934, the Emergency Relief Committee of San Francisco changed its policy in administering relief. Prior to that date relief was on a commissary basis, that is, boxes of food were distributed to families, fresh milk was delivered, and in addition a weekly stipend was allowed for the purchase of fresh meat. Beginning the first of March this system was changed to a cash relief basis for a trial period of 6 months. Families on relief received a weekly check with which they were to purchase their own food supply. It was felt by the committee that a survey of the nutritional status of the children who had been on this commissary system for the periods varying from 6 months to 2 years would show whether or not it had resulted in maintaining the nutrition of the recipients of relief. Upon their request the Department of Public Health undertook a systematic measurement and examination of the children of all families on relief.

Until recently standards of nutrition have been extremely unsatisfactory. Estimates of deviation from normal based on a specific weight for age and height are notoriously inaccurate. The A.C.H. Index, recently developed by Franzen & Palmer,¹ gives a satisfactory standard of nutritional status. This index is based on 3 measurements, arm

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

girth (A), chest depth (C), and hip width (H). These measurements subjected to two additions, a subtraction and reference to a table, serve to identify children with a marked discrepancy between the amount of soft tissue (muscle and fat) and the amount of bony tissue (skeletal build). Previously to the publication of this work, Pryor & Stolz² had submitted a somewhat similar plan to estimate normal weight, using a length-width index based on the height of the child and the width of the iliac crests. This length-width index of body build is used not only to designate types of build but also as a basis for weight prediction, a feature not present in the A.C.H. Index. The bi-iliac diameter divided by the height times 100 gives the length-width index and is a measure of the relative width of the body. The bi-iliac diameter can be measured more accurately than chest width or shoulder width because it is not affected by respiratory movements or changes in posture. This greater accuracy of the bi-iliac diameter can be demonstrated when two observers measure the same children.

Various complicated indices of body build have been advocated, each involving several body measurements of girths and diameters. A comparison of these measurements with the single bi-iliac

diameter, each in percentage of height, shows the same classification of body build for each system.

The bi-iliac method was the method of choice because it was more constant, more accurately and more easily measured, and yielded the same results. An added feature was that a control group of California children was available by this system. This control group included 2,000 public school children in San Francisco, Oakland, and San Mateo, 700 clinic patients at University of California Hospital, 300 at Children's Hospital, 300 private school boys, and 60 children in a special survey in Berkeley. The method of procedure was as follows:

Four regional centers were established, one in the main building of the Health Department and two in branch offices in the Mission and Alemany districts, the fourth center was in the North Beach section, the space being donated by the Telegraph Hill Neighborhood Association. Physicians to conduct the survey were furnished by the Emergency Relief Committee. Nurses and clerical force were obtained through the C.W.S.

The Emergency Relief Committee then set about getting the children to appear for examination, which was done through the Relief Visitors who were

We are undertaking a Nutritional Survey or a Health Study of children. Will you send

(Names of Children)

to Health Center at

(Address)

at on
(Time) (Day) (Date)

Carfare will be supplied if necessary. Arrangements have been made with the School Department to excuse the children for those hours.

(Address) (Visitor)

FIGURE I

We find that you have not taken advantage of the opportunity afforded by the Board of Health to learn the physical condition of your children. If you were unable to send the children before, have them report to

..... Health Center
at (Address)

at on
(Time) (Day) (Date)

The School Dept. will excuse the children for those hours. We hope you will coöperate in the interest of your children's health.

District No. (Visitor)

FIGURE II

made responsible for referring all children under their supervision to the Nutrition Centers. Postcards (Figure I) were mailed to parents inviting them to bring their children to the Nutrition Center for a physical examination and check-up and giving them definite ap-

pointments for the examination. Appointments were made for 50 children for each morning and afternoon session at all of the four centers. Each day names of those children reporting for examination were sent to the Relief Committee. This enabled the Relief

Name	Place and Date of Birth		Sex
Address	School		Grade
Date		Nationality of Father	
Age		Nationality of Mother	
Bi-iliac Diameter		Illnesses	
Height			
Weight			
Normal Weight			
Variation		Summary	
Muscle Tone			
Posture			
Physical Defects			
Physician			

FIGURE III

TABLE I

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH
NUTRITIONAL SURVEY PROJECT—1934
PRESCHOOL GROUP

(Total number of children examined—870)

Condition	Defect	Alemany	Central	Mission	Telegraph Hill	Total
	Extreme malnutrition	0	0	4	6	10
Skin	Communicable:					
	Impetigo	0	3	3	0	6
	Pediculosis	1	0	1	7	9
	Scabies	0	3	2	0	5
	Ringworm—scalp	0	1	1	0	2
	Ringworm—skin	0	1	0	0	1
	Non-communicable:					
	Not classified	1	4	0	1	6
	Eczema	1	0	7	8	16
	Urticaria	1	0	0	2	3
Orthopedic	Pronated feet	0	0	1	2	3
	Poliomyelitis (post-paralysis)	0	1	0	0	1
	Rachitic condition	0	1	6	1	8
Eye	Defective vision	0	2	1	3	6
	Corrected vision	0	4	1	0	5
	Strabismus	0	0	0	1	1
	Conjunctivitis	0	0	2	0	2
Ear	Defective hearing	0	0	0	0	0
	Chronic otitis media	0	0	0	0	0
Heart	Functional murmur	3	0	3	18	24
	Organic murmur	0	0	2	0	2
	Disturbance of rate	0	0	0	0	0
Lungs	Asthma	0	3	1	4	8
	Bronchitis	0	8	2	4	14
	Tuberculosis suspect	0	2	1	1	4
Teeth	Carious	11	20	45	11	87
	Prophylaxis (alone)	0	0	0	0	0
Mouth, Nose and Throat	Mouth breather	0	2	1	0	3
	Tonsils simple	22	11	66	26	125
	Tonsils infected	8	36	11	28	83
	Glands (cer.)	4	2	9	2	17
Nervous System	Defective mentality	2	0	0	0	2
	Defective speech	0	1	0	1	2
	Chorea	0	0	0	0	0
	Functional nervousness	0	0	0	0	0
Endocrine and Development	Thyroid	0	0	0	0	0
	Pituitary	0	1	0	0	1
	Hydrocephalic	0	0	0	1	1
Miscellaneous	Hernia (umbilical)	2	1	1	2	6
	Hare lip	0	0	0	1	1

Visitors to determine which children did not report and a second post-card (Figure II) was sent to them urging attendance. The response was excellent, over 4,500 children reporting for

examination in 7 weeks. The interest and coöperation of the public schools was secured, and a notice was printed in the *School Superintendent's Bulletin* requesting that principals excuse these

children from school upon presentation of their card from the Relief Committee.

After registration, the child was undressed and his weight and height were recorded on the physical examination card (Figure III). He was then presented to the physician who measured the bi-iliac diameter and proceeded to make a careful physical examination including an estimate of the posture and muscle tone expressed as "Good," "Fair," or "Poor." The normal weight and variation from the normal were not calculated at time of the examination. All physical defects found were recorded, and when necessary full notations were made on the reverse side of the child's card describing significant findings. The parent was given a slip of paper (Table IV) on which was indicated the need for medical attention, and was directed to report to the Relief Visitor on whom the responsibility for arranging for such attention had been placed. The Relief Visitor had also been given a duplicate of the form for parents and so was in a position to check on whether or not the physician's directions were being followed. Although the primary objective of the survey was to secure accurate data on the nutritional status of the San Francisco children on relief, the opportunity to do an intensive health promotion project was in this way not lost sight of.

For the purpose of tabulating results the children were divided into two age groups, the preschool group under 6 years and the school group, 6 to 16 years. The defects found among the preschool group were noticeably few. Of 840 children, only 10 were found with extreme malnutrition, estimated clinically. Eight apparently were found in the estimation of nutrition by the measurement method (Table III), corroborating the subjective estimate made by the physician at the time of examination. Without exception these children had never attended a Child

Welfare Conference and their feeding and hygienic regimen had at no time been under the direction of a physician. The remainder of the preschool group was remarkably free from defects. Among the school group the outstanding defects paralleled those found in routine school examinations, teeth and tonsils leading. The presence or absence of defects appeared to have no relation to nutritional status. An interesting sidelight on the examinations was that when severe physical defects of heart or lung were reported, check with the school health records invariably revealed identical notations and, in most cases, the child was found to be already under regular medical supervision. A tabulated list of the defects found by districts for each age group is given in Tables I and II.

After the examinations were completed the normal weights were estimated according to the tables furnished by Pryor & Stolz² and the variation from the normal calculated by taking

San Francisco Emergency Relief
Committee
51 Gough Street,
San Francisco, California

Date

Family Name

Man's First Name

Woman's First Name

Address

Baby's Name

..... M.D.

.....

(Clinic or Health Center)

File No. Visitor

FIGURE IV

TABLE II—SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH NUTRITIONAL SURVEY
PROJECT—1934—AGE GROUP 6-16 YEARS
(Total number of children examined—3,645)

	Defects	Alemany	Central	Mission	Telegraph Hill	Total
Condition	Muscle tone II	307	739	291	380	1,717
	Muscle tone III	35	22	45	127	229
Skin	Communicable:					
	Impetigo	0	6	4	8	18
	Pediculosis	11	0	17	38	66
	Scabies	1	5	10	6	22
	Ringworm—scalp	0	0	2	0	2
	Ringworm—skin	1	1	2	0	4
	Non-communicable:					
	Acne	1	1	6	5	13
	Eczema	3	1	6	5	15
	Vitiligo	0	0	2	0	2
	Allergic	1	0	2	1	4
	Not classified	10	0	0	0	10
Orthopedic	Posture II	340	942	472	447	2,201
	Posture III	87	49	32	124	292
	Scoliosis	3	0	5	0	8
	Pronated Feet	0	0	2	2	4
	Rachitic conditions	8	8	15	0	31
	Poliomyelitis	0	1	2	0	3
Eye	Defective vision	6	18	0	9	33
	Vision corrected	0	1	5	8	14
	Strabismus	0	2	5	7	14
	Conjunctivitis	0	1	0	2	3
	Marginal blepharitis	1	6	3	2	12
Ear	Defective hearing	0	2	1	3	6
	Otitis media chronic)	0	2	0	0	2
Heart	Functional murmur	13	12	6	46	77
	Organic murmur	5	3	3	2	13
	Disturbance of rate	1	1	3	0	5
	Disturbance of rhythm	0	0	1	0	1
Lungs	Asthma	0	2	3	5	10
	Bronchitis	3	7	4	8	22
	Tuberculosis suspect	1	5	3	10	19
Teeth	Carious	282	445	557	220	1,504
	Prophylaxis (alone)	13	2	65	14	94
Mouth, Nose and Throat	Mouth breather	3	15	14	5	37
	Enlarged tonsils	109	100	259	173	641
	Tonsils diseased	23	19	10	31	83
	Cervical adenitis	10	4	51	14	79
	Sinusitis	2	1	6	4	13
Nervous System	Defective mentality	0	3	3	4	10
	Defective speech	0	0	1	3	4
	Chorea	0	1	0	0	1
	Nervousness (functional)	1	3	1	2	7
	Epilepsy	0	0	0	1	1
Endocrine and Development	Thyroid enlargement	3	0	2	8	13
	Pituitary	0	0	1	1	2
	Obesity (not classified)	3	0	1	0	4
	Microcephalic	0	0	0	1	1
Miscellaneous	Cleft palate and hare lip	2	1	1	0	4
	Cleft palate	0	0	1	0	1

TABLE III

SAN FRANCISCO DEPARTMENT OF PUBLIC
HEALTH NUTRITIONAL SURVEY
PROJECT—1934

PRESCHOOL GROUP

<i>Percentage Group</i>	<i>Total</i>	<i>Percentage of Total</i>
Overweights		
17-20%	4	0.45
13-17%	13	1.49
9-13%	38	4.36
5-9%	98	11.26
1-5%	238	27.35
Normal	116	13.33
Underweights		
1-5%	217	24.94
5-9%	105	12.06
9-13%	33	3.79
13-17%	7	0.80
17-20%	1	0.11
Total	870	

the difference between actual and normal weight. The number and percentage of the total group and the percentage of their variation from the normal is shown in Tables III and IV. This group compared with a control group is graphically shown in charts (Figures V and VI).

DISCUSSION

The interpretation of these figures and the conclusions to be drawn from them are at present a subject for discussion.

In the school group (Figure VI) it is possible to say that 11 per cent are 10 per cent or more underweight, and in the preschool group (Figure V) less than 5 per cent are in this classification. Comparing this with the control group the figures are 13 per cent and 8 per cent respectively. Certainly it would seem logical to draw the conclusion that underweight for body build was not more, or even as prevalent among the relief group as among the control group.

Referring to the graphic chart of the school group (Figure VI) the widest

variation occurs with the children 5 per cent underweight, a variation of 7 per cent rapidly converging to the point 5 per cent overweight. From that point on to the extreme overweight the relief group is convincingly in the majority.

With even a conservative interpretation of these findings it must be admitted that the nutritional status of children who had been on commissary relief compare very favorably with a normal or even more privileged group in the community.

The homographic aspect of the preschool group chart needs but little comment. However, it would seem to refute, for San Francisco at least, the frequently repeated charge that the preschool age was the neglected age, at least as far as nutrition was concerned. When we consider, however, that the

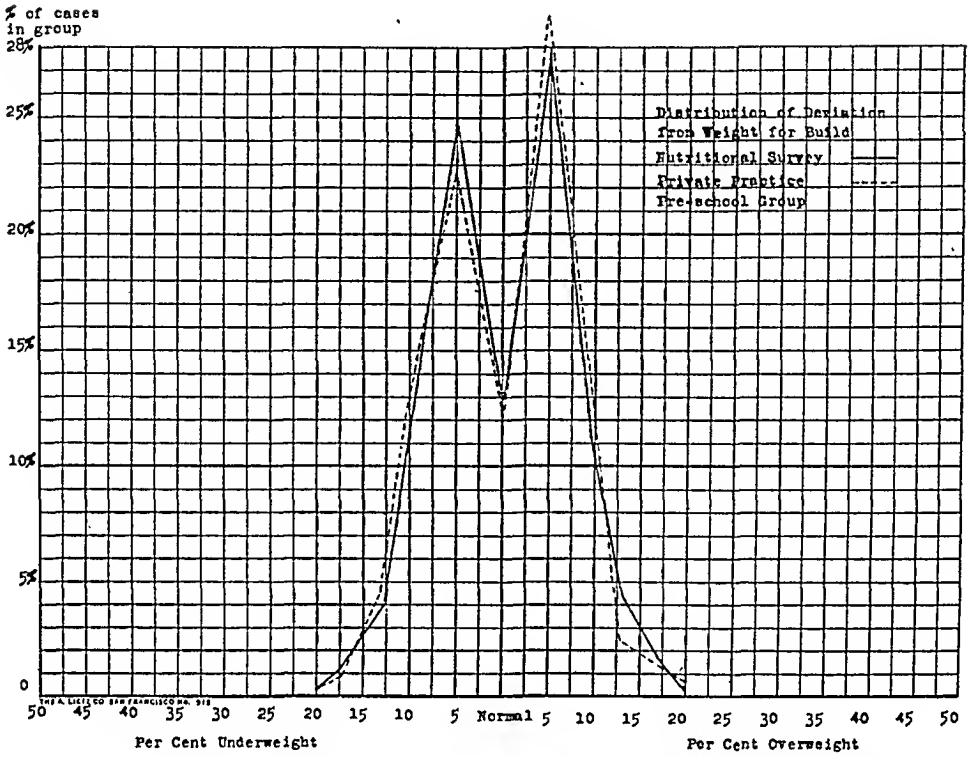
TABLE IV

SAN FRANCISCO DEPARTMENT OF PUBLIC
HEALTH NUTRITIONAL SURVEY
PROJECT—1934

AGE GROUP 6-16 YEARS

<i>Percentage Group</i>	<i>Total</i>	<i>Percentage of Total</i>
Overweights		
51-75%	13	0.35
46-50%	5	0.13
41-45%	11	0.30
36-40%	18	0.49
31-35%	46	1.26
26-30%	72	1.97
21-25%	159	4.36
16-20%	261	7.24
11-15%	416	11.41
6-10%	542	14.86
0-5%	451	12.37
Normal	440	12.07
Underweights		
0-5%	382	10.48
6-10%	422	11.57
11-15%	276	7.57
16-20%	93	2.55
21-25%	21	0.57
25-30%	11	0.30
30-50%	3	0.08
Total	3,645	

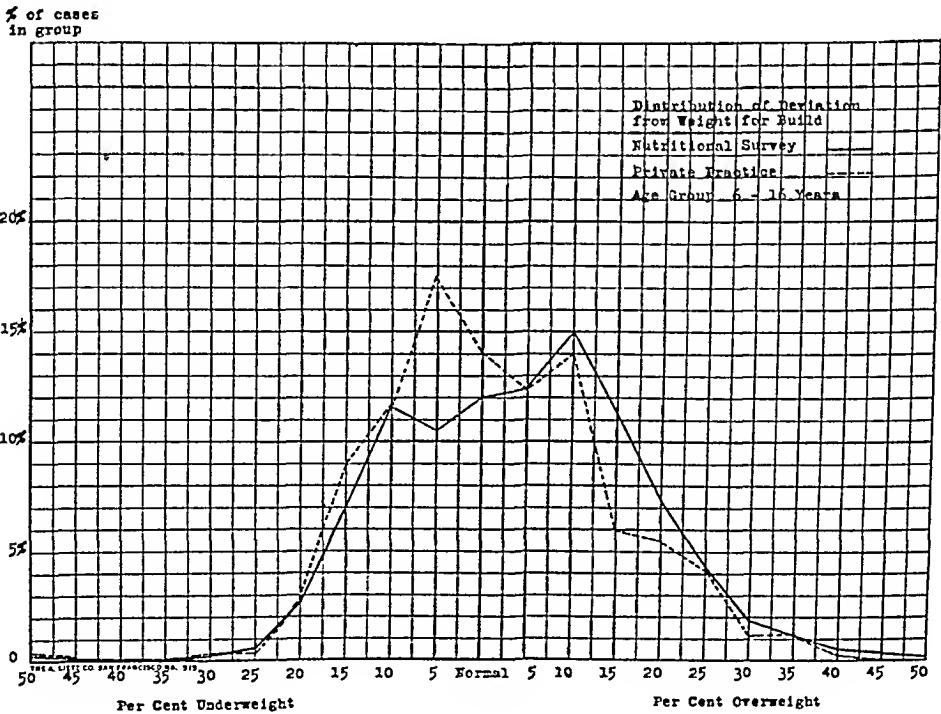
FIGURE V



vast majority of these children were registered in well baby conferences throughout the city the result is not surprising.

Six months ago the families of these children went on cash relief. It would seem highly desirable to repeat this survey, beginning if possible soon after

FIGURE VI



the first of September. The comparison of the results of the two examinations would be extremely valuable although the time is perhaps too short to judge adequately the advantages or disadvantages of the cash system. In addition a second examination would afford an opportunity for the comparison of weights in individual children which would undoubtedly be of considerable value in estimating the trend of growth and nutrition of the child.

Other considerations include the follow-up work for correction of remedial defects and the selection of special children whose wide variation from the normal height-weight ratio would single them out for special study.

If for purposes of discussion the length-width index as described is to some degree a measure of nutritional status, it would seem advisable to conduct similar surveys in various parts of the country.

The objection relative to expense raised editorially in the *J.A.M.A.*³ a year ago is no longer a valid one. With the F.E.R.A. in operation public health officials are continuously besieged to provide work projects for the professional groups. What more profitable way to employ our needy professional brothers and sisters than by securing a cross-section of the physical condition of the children throughout the country? The use of a standard system of measuring is of course advisable for purposes of comparison. The methods used at present to arrive at a diagnosis of malnutrition are almost as numerous as the workers.

Until a more satisfactory standard is developed the simple procedure described is recommended as the one of choice. Its advantage over other methods, in addition to its simplicity,

is that it can be used as a basis for weight prediction.

While it is admitted that malnutrition has never been confined to the poor, a survey of relief groups may do much to counteract some of the hysteria and even panic created by well meaning but uninformed self-styled nutritionists by their dismal picture of what was happening to our child population in the depression.

Finally it must always be borne in mind that malnutrition is a symptom and not a clinical entity. Without a well planned follow-up the mere collection of statistics may indeed be called an idle gesture.

SUMMARY

1. A change in the plan of administering relief in San Francisco made it advisable to estimate the nutritional status of the children who had been receiving aid.
2. A length-width index of nutrition was chosen as the method of selection.
3. The technic of conducting the survey is described.
4. A statistical analysis of the findings is presented.
5. Recommendations for a continuation of the study are made.

CONCLUSION

1. The relief program prior to March 1, 1934, was adequate as far as the nutritional status of the children measured by a length-width index, is concerned.
2. The aspect of health education by the physical examination for the discovery of defects was not neglected.
3. There is need for a second and third examination at intervals of 6 months.
4. Similar undertakings would be advisable throughout the country using F.E.R.A. funds.

REFERENCES

1. Franzen, Raymond, and Palmer, G. T. The A.C.H. Index of Nutritional Status. *Child Health Bull.*, 10:26 (Jan.), 1934.
2. Pryor, Helen B., and Stolz, Herbert R. *J. Pediat.*, 3, 4 (Oct. 3), 1933.
3. Editorial, *J.A.M.A.*, 101, 17:1318 (Oct. 21), 1933.

City Health Department Clinics*

Activities of Public Health Nurses in Case Finding and Case Holding in Relation to Syphilis

RACHEL K. MILLER, R.N.

Health Department, Oakland, Calif.

CLINICS for the treatment of syphilis abound today, and yet, either there are not enough of them or most of those which do exist are not properly administered. The incidence of syphilis is not appreciably reduced. This presents a definite challenge to health departments to formulate and administer improved programs. Case finding methods should bring in a much larger percentage of early cases for diagnosis, and case holding systems should keep these cases for treatment and observation until they have been symptom free over a long period of time.

The first element of importance perhaps is to eliminate fear and establish confidence. When people have faith and hope and know the source from which help comes, they besiege the giver and have neither to be sought nor held. The newly infected person who has been taught to recognize symptoms and can feel that treatment will be given without stigma, will be more liable to ask for treatment and come for it. Everyone who comes to the clinic is motivated by hope, and most are not only ill but are dwarfed by wounded pride and thwarted ambition. Everyone

who leaves the clinic should go out with confidence in its ability to help.

Michael Davis in his book *Clinics, Hospitals and Health Centers* makes the following statement: "The most important element in effective case control is the work done *while the patient is in the clinic*, not the correspondence or even the home visits which come afterward." Good service to the patient in the clinic, particularly at the first visit, is the most important single factor.

The public health nurse has a unique part to play in making a clinic a success. Hoping for results in a syphilis control program, she has acquired an understanding of the disease, its etiology, the modes of transmission, the usual methods of diagnosis and treatment, and the common reactions. She has also cultivated a sensitiveness to individual needs, especially in relation to mental and social complexities and twisted attitudes. Moreover, she has acquainted herself with the social welfare agencies of the community and has some idea where to turn to find assistance in making suitable adjustments that will enable the patient to continue treatment or to protect others. The possession of such qualities enables the public health nurse to perform a superb service as a go-between for clinic and home, physician and patient, the patient and his family, his friends and his employer. Thus equipped, she is

* Read at a Joint Session of the American Social Hygiene Association and the Public Health Nursing Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

far too valuable to devote her entire time to determining eligibility, or to routine clerical assistance of such proportions that no time is left available for the very important social and educational measures which should be a part of every clinic.

Within the clinic the nurse makes a contribution to case control by the manner in which she receives patients. The ability to put herself in the patient's place and treat him as she herself would wish to be treated under similar circumstances, is her most valuable asset. She is interested in the patient as a human being; not as case "No. 768." When she approaches the printed forms intelligently and not in the manner of saying "Just another case," she wins the confidence of the patient. One clinic reports that the giving of false addresses and delinquency in returning for treatment are rare. Another finds just the opposite to be true. Is this not due to the manner in which patients are treated? No individual relishes indifference or haughtiness. It matters greatly to the patient whether he is received by a disinterested registrar who routinely follows a list of questions, or whether he is met by a personality sensitive to his problems. The nurse who can, through carefully directed conversation, obtain all the pertinent facts without direct questioning and without antagonizing and arousing negative reactions, performs an effective part in case control.

Careful history taking is another important contribution which the nurse makes to case control. If the nurse's records contain such phrases as "history of contacts not significant," or if she permits herself to be so dull as not to find one hint of the source of the patient's disease, it is no wonder she is sometimes relegated to less important services such as "pulling" histories and making out appointment slips. Many clinics, however, have learned the

economy of correct history taking by a careful nurse. It is an indispensable aid in the discovery of possible cases, and in dealing with cases where special adaptations are indicated; for example, while taking history one day, the nurse observed that the patient fidgeted considerably and that her eyes turned repeatedly toward the clock. She immediately sensed the patient was in a hurry and in response to one sympathetic comment she learned that the woman had left a sick baby at home, that her husband was taking care of it but had to be at work at a given hour which fast approaching, and that the woman had already waited her turn for 2 hours. The nurse then handled the situation so that an exception was made to the usual routine and the woman was seen by the physician and enabled to return home and relieve her husband in time for his work. The nurse noted on record "family responsibilities," which would indicate to any of the clinic personnel that special adaptation was required.

Patients appreciate such individual treatment and when it is received there is seldom any call for coercion. Necessity for coercion should be considered reason for frank acknowledgment of failure on the part of clinic personnel. The patient has understood or has not been understood.

The usual function of the nurse, as interpreter to the patient the specialist's findings, renders her of utmost value in case control. Every patient will respond to a clear explanation of his particular case and with more enthusiastic coöperation. The nurse realizes that no two cases are ever exactly alike and recognizes the need, as interpreter, to connect the physician's findings with facts in the patient's own environment that his interests and attitudes may be sufficiently stirred to motivate coöperation.

Every person who has been success-

fully treated for syphilis should be urged to become a teacher in the campaign for prevention and cure of the disease. In some clinics a nurse regularly conducts a lecture to a waiting group. This appears to be a valuable method of case holding. Patients who think they are cured after a few injections, or after 1 negative Wassermann, or when they feel "perfectly well," ordinarily become delinquent. By clarifying and explaining why these are not good reasons for discontinuing treatment, the nurse holds many of these cases without lapses. The lecture period makes clearer to patients the urgency of reporting promptly anything which is troubling them in relation to treatment—a painful injection, an unexpected reaction, or any social circumstances which make clinic attendance difficult.

The nurse tries to excite an emotional reaction against the present state of affairs and a hope of something better. She presents a truthful picture of the tragic effects of untreated syphilis and tries to inspire each patient with a sense of responsibility, not only to himself, but to his family, and to the community who have to bear the suffering of congenital syphilis or the miserable effects of late lues. She also explains, in simple language, the ways in which syphilis is transmitted, the necessary concurrent disinfection, and the hygienic measures the patient should adopt to protect others, and urgently emphasizes the necessity of immediate observation and careful examination of all contacts.

The nurse often makes herself valuable as an educator in other ways within the clinic. She endeavors to guide all the patient's experiences within the clinic, so that they may favorably influence "his habits, his attitudes and knowledge" in relation to the prevention of syphilis. She tries to have the waiting and examining rooms arranged and managed in accordance with hygienic values. She tries to do

away with unnecessary massing of patients in one crowded waiting room for long hours of waiting. She takes an interest in the decoration of walls and the supply of pamphlets and pictures of an educational nature.

An elderly patient who had just been employed, after 2 years without any job, came to a clinic one day at noon, hoping to have an early chance for treatment. A large group was already waiting. The old gentleman waited until it was almost 2 o'clock and then when he explained to an attendant that his new job demanded that he be on duty at 3 o'clock. "Have to wait your turn," snapped the attendant, and a few weeks later the public health nurse had to hunt up another delinquent. As one discordant instrument in the orchestra ruins the symphony so one member of the clinic staff who is not in harmony with the ideals of individualization for case holding spoils the work already done by others.

Most clinics waste too much of the patient's time. Various adaptations of the appointment system have largely overcome the long periods of waiting. Still when carfare and absence from work require deprivations of a sort, clinic appointments should be carefully gauged. The nurse has an important part to play in emphasizing courtesy and individualization of the patient.

Well regulated clinics find some sort of efficient follow-up system indispensable, not only for case holding in a few instances, but for case finding among contacts of a syphilitic patient. Here again, the public health nurse functions. She visits homes and, with understanding and tact, makes an approach which leads patients, new and old, to the clinic doors. If the nurse serves periodically within the clinic in close coöperation with the physician she finds familiarity with present-day procedures a distinct advantage outside the clinic. It makes her more adept in

case finding and in handling the perplexities of patients, especially in relation to misunderstood instructions. She helps to make social adjustments. Frequently she is called upon to clarify a patient's position in relation to his employer, and thus wins the patient's gratitude and renewed will to cooperate by helping him to hold a job from which an employer, untutored in the communicability of the disease, had unwisely expected to "fire" him.

The public health nurse, in the field, seeks to stimulate interest in routine Wassermanns on all prenatal cases; supervises the new-born babes of syphilitic women. She realizes that public information regarding syphilis is woefully lacking and tries to develop a sane, unemotional attitude toward it. Some years ago families tried to hide tuberculosis if it existed in their midst and thereby failed to take proper measures for its control in fear of an imagined stigma. What marvelous progress in change of attitude was indicated when several years ago, the newspapers of the country broadcast that a son of the President of the United States was found to be a victim of early tuberculosis and was to receive prompt treatment in a mountain rest home! Such publicity might never be desirable in relation to syphilis, but surely it is obvious that a change of attitude in regard to it must continue.

It has been estimated that about 10 per cent of syphilitics contract their infection in an innocent way. It is well also to recall the words of Dr. John Stokes, who writes that "no genealogic tree is so pure that syphilis has not twined itself among its branches." The nurse who carries into the homes a calm, scientific attitude toward this disease helps to bring about the revelation of many new cases.

Every case found, carefully studied for the identification of his intimate contacts, is a means of prevention and

eradication of the disease. The follow-up depends for its success upon a very thoughtful method of approach. In this connection Dr. Nels A. Nelson writes as follows:

The search for "sources of infection" requires understanding. It is unfortunate that the term "source of infection" ever came into use in this connection. It is the most antagonistic approach that could possibly be made. A person who is accused of having infected another is quite naturally on the defensive. It is a perfectly understandable reaction. It is often an unjust accusation. The patient, on being questioned as to his exposures, naturally thinks of the last one. The incubation period is long enough and variable enough so that his contacts during that period may have been many. The last partner may have been exposed to his infection rather than have been the cause of it. Or the patient may have an acute recurrence of an old neglected infection which he mistakes for a new one. All of his recent contacts may then be victims of the patient's infection.

It is always safest to approach a contact, whether or not the alleged source of an infection, as the possible victim of an infection. Certainly every "source of infection" must, at some time previously, have been the victim of another infection. The person thus approached is concerned in his or her own interest as the offended party. As there is no need for defense against accusation, the advice to seek medical attention is more readily accepted. It is better to think always in terms of case-finding than in the uncertain and often unjust term of search for the "source of infection."

CONCLUSION

In spite of the large number of syphilis clinics in the United States there are very few localities where a well rounded piece of work is being carried on. There is need, in general, for less secrecy and a more scientific attitude toward this very prevalent disease, and in particular there should be greater individualization of cases. Each case is a potential teacher, each case a pivotal point for the location and eradication of many other cases.

Success of the most efficient medical treatment rests upon a well rounded

supporting service, in which every member of the staff shall be imbued with the ideal of complete eradication of syphilis, that the ever present danger in any institution of letting it degenerate into a machine shall be obviated. The Master

has told us that "not a sparrow falleth" without the Creator's attention. When such is the spirit of the clinic its service to humanity in the eradication of human misery due to disease will have manifoldly increased.

Campaign Against Diabetes

ORGANIZED work against diabetes in New York City has begun with the formation of the New York Diabetes Association, affiliated with the New York Tuberculosis and Health Association, and to be associated with it at its headquarters, 386 Fourth Avenue, New York, it has been announced.

The formation of the service on diabetes was made possible through a special contribution of \$15,000, given by Lucius N. Littauer, toward the first three years' work.

In presenting his subscription, Mr. Littauer expressed the hope that the establishment of this work against diabetes would lead to the control and possibly the reduction of the growing mortality from the disease, and stressed the fact that the coördination of activities in the fields of both tuberculosis and diabetes would result in mutual benefit to sufferers from these diseases, as diabetes greatly aggravates the condition of tuberculous patients.

Commenting upon the formation of the new association, Dr. Charles F. Bolduan, of the Department of Health of the City of New York, pointed out that the registered deaths from diabetes in New York City have increased since 1923, when there were only 1,360, to

2,141 during 1933—a figure which puts the disease here among the leading causes of death. Twice as many women as men die of diabetes, he added; last year there were 1,418 of the former and 723 of the latter.

The New York Diabetes Association proposes to act as a clearing house for the study of the disease as a health problem and to devise measures for its control; to assist in the formation of an association of clinics dealing with diabetes; to develop graduate courses of instruction for physicians; particularly to carry on health education of the general public in all matters pertaining to the disease; and to obtain the provision of insulin for indigent diabetics, and nursing service and hospitalization for all requiring it.

The association plans to operate in a city-wide basis under the leadership of noted physicians in the diabetic and metabolic fields, and to include in its council representatives of the tuberculosis and health associations, members of the New York Academy of Medicine, of the Departments of Health and Hospitals of the City of New York, of the county medical societies, of schools of medicine; public and private hospital authorities; representatives of social and welfare agencies, and interested laymen.

Nutrition and Health and the Price of Milk*

JAMES A. TOBEY, DR.P.H., F.A.P.H.A.

*Director of Health Service, The Borden Company,
New York, N. Y.*

DAIRYING has long been recognized in this country as a basic industry, the proper conduct of which is essential to our national progress, welfare, and prosperity. Milk is, in fact, the most important agricultural commodity in the United States. This prominence is due not merely to the fact that milk and milk products from American farms constitute our greatest single source of agricultural income, but because the regular consumption, by all of the people, of more liberal amounts of pure milk and dairy products unquestionably would be an important factor in the improvement of national vitality.

This desirable increase in the consumption of clean and safe milk and its many products is, therefore, a matter of both economic and biologic significance. Biology and economics are factors that are closely interwoven in the whole science and art of public health, particularly in matters relating to human nutrition. If we could solve the intricate problems of supply and demand, of costs and prices, of reasonable regulation, and of better public appreciation of dairy products, we should contribute immeasurably to

human welfare, both with respect to national prosperity and public health.

MILK CONSUMPTION AND THE PUBLIC HEALTH

Despite the fact that modern science has demonstrated in a long series of brilliant investigations that milk is indispensable to adequate human nutrition, and that the dietary qualities of dairy products surpass those of practically all other foods, the average American consumes too little milk. In 1933, the annual per capita consumption of fluid milk and cream was only 38.8 gallons, or 0.85 pint, a day. Sectionally, some parts of the United States are much worse off in this respect than are others. In the South Atlantic and South Central states, the daily average is only about $\frac{2}{3}$ pint a day, whereas in the North Atlantic states, nearly 1 pint of milk was taken by each person every day. In the Western and North Central states the daily quantity of milk consumed was about the same as the average for the whole country.

Our per capita milk consumption is now about where it was a decade ago. Up to 1929 it was steadily rising, the annual increase being due in all probability to improvement in the sanitary quality of market milk supplies, greater public confidence in the safety of milk, more extensive knowledge of its nutritional benefits, and greater purchasing

* Read at a Joint Session of the California Association of Dairy and Milk Inspectors, the California Dairy Industries Association, the California Dairy Council, and the Food and Nutrition Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

power in those relatively prosperous times. Since 1929 there has been a consistent decrease from a per capita of 40.8 gallons in 1929 to 38.8 gallons, or a reduction of about 5 per cent. Until the coming of the drought, there had not been an accompanying decrease in production, which is one of the several reasons why we have a milk problem.

Scientists who have worked out the mass food requirements of the American people on a careful nutritional basis declare that even in a restricted diet for emergency use, 155 quarts, or 38.75 gallons, of milk are necessary for each person in the course of a year. Today our people are, therefore, barely living on a restricted and meager milk diet. For an adequate diet at minimum cost, not less than 260 quarts, or 65 gallons, of milk or its equivalent in other dairy products is advised. For an adequate diet at moderate cost, or for a liberal diet, the per capita figure is set at 305 quarts, or 76.25 gallons of milk annually.¹

From these authoritative data, it is obvious that milk production and consumption in the United States ought to be increased by about 70 per cent. In theory, an increase in milk production, from the present 3,269,470,000 gallons annually to more than 6,000,000,000 gallons, is economically and biologically sound. The difficulty is an impassive public, not yet wholly convinced that pure milk is what it is, an economical and inexpensive food of unique dietetic properties.

MASS STUDIES ON THE VALUE OF MILK CONSUMPTION

The people of the United States, living under an aura of scientific progress, are, strangely enough, much less addicted to the use of dairy products than are the citizens of many other nations. Our per capita consumption of whole milk has always been exceeded by that in Finland, Switzerland, Norway, Can-

ada, and the Netherlands.² The consumption of butter is far greater in New Zealand, Canada, Australia, and the Netherlands than in our country, where butter is so abundant. In the use of cheese, we rank 12th, our consumption of this nutritious and savory product being less than half that of the peoples of 9 other nations. It may be more than a mere coincidence that the general death rates are lowest, the duration of life is longest, and the people are most rugged, in countries where the consumption of sanitary dairy products is greatest.

The favorable influence on healthful longevity of the regular consumption of optimum amounts of pure milk is now as well established as is the unfavorable effect on infant and general mortality of impure and contaminated raw milk. Proof has come from the laboratory that milk consumption is conducive to life prolongation.³ If, however, statistical data for entire nations have not yet been adduced to confirm this fact, other interesting scientific experiments have demonstrated the value of increasing the use of milk in large populations. Two of these studies are worthy of special mention.

The most noteworthy and most extensive investigation on milk was conducted in Scotland.⁴ Between 1927 and 1930, nearly 25,000 school children participated in 3 separate tests to determine whether supplementary daily feedings of raw or pasteurized milk would influence physical growth. In the first test, involving 1,282 children over a period of 7 months, the milk-fed group showed an increase of weight and height 20 per cent in excess of those who were not favored with this extra milk. In the second test, which included 1,157 children, the milk groups increased their heights 23.5 per cent more than the controls, and gained 45.4 per cent more in weight.

For the third test, no less than 20,000

children were selected in the schools of Lanarkshire. In the course of 4 months, one-half of these Scotch children were given $\frac{3}{4}$ pint of tuberculin tested milk every day. Raw milk was given to 5,000, and pasteurized milk to 5,000. The results confirmed the previous experiments, showing conclusively that milk makes a notable difference in the physical development of young children. During the comparatively short period of this test, the milk-fed group gained on the average from 4 to 6 ounces more in weight than the controls. Another feature worth noting was that there were no measurable differences in the effects of raw and pasteurized milk. Recently a careful statistical analysis of the data, made by dividing the children into identical pairs, was carried out in the laboratory of Professor Karl Pearson.⁵ The observation that children who have extra milk gain in height and weight over those who do not was confirmed, as was also the fact that pasteurized milk is as efficacious as raw milk for this commendable purpose.

A law passed in 1930 in Scotland empowers local authorities to supply graded milk to school children, a policy deserving of emulation in our own country. "It is expected," says an editorial in the London *Lancet*,⁶ "that this power will be widely used in the near future and will result in a noticeable improvement in the physique of the Scottish race."

The definite influence of milk consumption on the physique and general health of a race has been shown by another recent study, conducted by British medical officers in Africa.⁷ Examination of the members of two neighboring tribes in Kenya revealed that the full-grown male of one tribe, the Masai, was on the average 5 inches taller, 23 pounds heavier, and had 50 per cent greater muscular strength than the adult male of the other tribe,

euphoniously known as the Akikuyu. Marked difference was also found in the incidence of disease in the two tribes, bony deformities, dental caries, anemia, pulmonary maladies, and tropical ulcer being more prevalent among the physically smaller Akikuyu.

When the physicians sought for a reason for these differences, they discovered that the diet of the stalwart Masai consisted mainly of milk, meat, and raw blood, whereas the sustenance of the puny Akikuyu was derived from cereals, roots, and fruits. In other words, a milk and meat diet makes strong men with powerful physiques, and a strictly vegetarian fare produces weaklings. This fact has been noted before in the course of human history, for the conquerors have always been owners and users of cows, and not eaters of grasses and grains. The victors have been victorious on diets of calcium and protein, and not on carbohydrates.

FACTORS INFLUENCING MILK CONSUMPTION

Granted that these two examples, selected from the many scientific investigations on milk that could be cited,⁸ offer persuasive and cogent reasons for augmenting the national consumption of pure milk, the question arises as to what factors must be considered in attempting to bring about an increase of the use of milk in the United States. Certainly, the milk companies and the various national organizations supported by them have been endeavoring to perform this praiseworthy task, and in doing so, have always had the active coöperation of federal, state, and local health and agricultural officials.

The primary factors affecting milk consumption are: (1) the availability of milk, (2) the quality of milk, (3) the cost of milk, (4) the wisdom and knowledge of the public, and (5) the purchasing power of the consumer.

Milk of good quality is now generally available in all parts of this country, although the quality is, on the whole, much better in the larger cities than in the rural sections. This improvement has been due in part to a gratifying increase in the amount of pasteurized milk—some 88 per cent of all our market milk now being pasteurized, if the possibly rather optimistic estimate of the U. S. Public Health Service is correct. In the few regions where fluid milk is unobtainable, or in those places where its purity may still be questionable, the public can always obtain the concentrated milks, including evaporated, powdered, and condensed. These processed milks exhibit virtually the same nutritional properties as pasteurized milk, and they are clean, safe, and in some instances, sterile.

The knowledge of the public regarding milk is one of the outstanding factors affecting its consumption. Better education of the people as to the merits of milk tends to bring about gratifying retention of milk and dairy products in the diet, even in times of depression, a phenomenon which was emphasized by Dr. A. Gorini of the International Labour Office in an address at the recent World's Dairy Congress in Rome (April 30–May 6, 1934). He called attention to studies in Belgium and Germany which revealed that increases in the purchasing power of the worker invariably resulted in greater uses of milk and dairy products, with corresponding decrease in the use of the less nutritious cereals and potatoes. This observation is not novel, but is the basis of one of the dogmas of economics.

Education can, however, often alter erroneous sociological principles, a fact which is beginning to percolate even into the consciousness of the sovereign power. The Legislature of the State of New York recently appropriated half a million dollars to advertise the estimable qualities of milk as food. This cam-

paign, which is now in progress, is financed by levying a tax of 1 cent per 100 pounds of milk and cream sold in fluid form, half of the amount to come from producers and half from distributors. As usual, the industry pays, and it would seem more logical if this worthwhile campaign were conducted by the industry itself, rather than by the state, which should, nevertheless, lend the weight of its authority to the support of it. Milk is not a public utility, according to a recent decision of the United States Supreme Court,⁹ although the milk industry is subject to reasonable regulation in the public interest.

Milk is not a public utility, nor is it a luxury. If all the people could be made acutely cognizant of the economy and the necessity of milk consumption, and aware of the fact that money devoted to the purchase of milk produces a substantial return on the investment, there would be much less agitation and misconception regarding the alleged high cost of milk.

FACTORS AFFECTING THE PRICE OF MILK

As with every industrial commodity, the price of milk is governed to a considerable degree by supply and demand. Theoretically, the present supply of milk in this country is only a little more than half what it should be in order to meet the health requirements of the nation, but actually the demand is less than the supply.

One of the causes of this unhealthy state of affairs has been a great expansion of the dairy industry in recent years, an expansion which ran full tilt into the economic depression. Between 1929 and 1933 there was an increase of 14 per cent in the number of dairy cattle in this country, or a rise from some 21,000,000 cows to about 26,000,000. Experience has shown that increases in the cow population occur in cycles of about 15 years each, 7

up and 7 or 8 down, and that we are now at the peak of one of these cycles. Aside from this bovine cycle, however, there has also been a steady increase in the number of dairy cattle, due to human population increases and other biological factors.

Although the demand for milk has not kept pace with the supply since 1929, the decrease in milk consumption has been less marked than in the case of many other products affected by the depression, even, in some instances, where prices were drastically reduced. This provocative fact may afford us some comfort.

The price of milk declined with the depression, but not to the same extent as some other dairy products, such as butter and evaporated milk. If the decline in the price of fluid milk had been too drastic, the depression might have been accentuated, because the leading cost factor in the milk industry is labor. The maintenance of the wage scale is obviously a matter of great economic and sociologic significance.

Two-thirds of the retail price paid for a bottle of milk is devoted to the compensation of labor, including that of the farmer, although the expenses of the farmer also include feed and other supplies. In New York City, for example, the average retail price paid by the customers of the largest milk company in 1933 for all grades of milk was 9.1 cents a quart. Of this, 4 cents went to the farmer or his agent, the coöperative, and $2\frac{3}{8}$ cents was paid for labor, including the personnel at country milk plants, at pasteurizing and bottling plants, in laboratories and offices, the delivery and sales staff, and the veterinarians and inspectors. Adequate sanitary supervision adds, of course, to the cost of milk, but is worth it.

Of the remaining one-third of this average retail price, $1\frac{5}{9}$ cents was spent on materials, such as bottles,

cases, and cans, on coal and gasoline, on feed and bedding for horses, and their replacement, on the maintenance and wear and tear of vehicles, and of dairy plants and their equipment. Another $\frac{7}{8}$ cent went for railroad and motor transportation. Advertising received only $\frac{1}{16}$ cent, taxes $\frac{1}{9}$ cent, and officers' salaries only $\frac{1}{50}$ cent. Although the big milk companies have been accused of paying enormous salaries to their executives, the largest companies actually have lower costs for this purpose per quart of milk than the small companies.

After all these necessary expenses have been met, the little that remains is profit. In the case outlined, this amounted to about $\frac{1}{8}$ cent on each quart of milk sold, which went to thousands of individual stockholders, who put this money back into circulation. Studies of the profits of 19 milk dealers in New York City, including the 5 largest companies, reveal that in August, 1933, they had to sell 143 quarts of milk in order to make 1 cent profit.¹⁰ In 1934, under the exacting requirements of the N.R.A., the A.A.A., and the rest of the federal alphabetical gamut, many of the milk companies were operating at a loss. No one but a moron or an agitator could claim that profits such as these are excessive, although there are plenty of persons in both of these categories, some of them in high places, who do say so.

THE ECONOMY OF MILK AS A FOOD

Despite the fact that the most sapient authorities on nutrition, including government officials, professors, and other pundits, universally advocate the expenditure of from one-fifth to one-third of the family food budget on milk, the actual expenditure for this indispensable food is now only about one-tenth of the average American food budget. The fraction now allotted to milk could be doubled without increasing the daily

expenditure for food. Departure from a false and penurious policy regarding the purchase of milk would, moreover, more than double the nutritional value of the diet, and would also react favorably upon our dejected dairy industry.

The true economy of milk can be demonstrated by comparing the costs of its nutritional constituents, its fat and carbohydrate, its proteins and minerals, and its vitamins, with other staple foods. The comparison will be found favorable to milk, the average retail price of which in this country is now about 11 cents a quart, or approximately 5 cents a pound, or $1\frac{2}{3}$ cents per 100 calories provided for the proper functioning of the human machine.

Pound for pound, milk is cheaper than all other foods, except one or two of the vegetables, but this basis of comparison is not, of course, strictly fair. In 100 calory portions milk is less expensive than many foods, and it is, therefore, a relatively inexpensive source of energy. Most meats, for example, exceed 3 cents per 100 calories, in contrast to milk at $1\frac{2}{3}$ cents. Fruits and many vegetables bought in cities will cost from 3 to 20 cents per 100 calories. Breads, cereals, potatoes, and a few other vegetables are cheaper than milk as sources of energy, but fuel is about all that some of these foods provide, whereas milk gives much more than that. Calories are only a part of the story.

As a source of protein, milk is cheap, and cheese is even cheaper. The cost of 100 protein calories from cheese is, in fact, less than half the cost of the same number in beef, and only a third that of eggs. If we could put a price on calcium and phosphorus, the minerals requisite for strong bones and teeth, we would find that milk is exceptionally cheap. It is the best dietary source of these necessary minerals and it yields the daily gram for a price far below any other food. An equivalent

amount of calcium from lean beef, for example, would cost the consumer 100 times as much as from milk. Securing calcium from spinach costs $3\frac{1}{2}$ times as much as from milk.

The vitamins in milk are worth money. Since, however, it is difficult to assign financial values to them, the vitamins may be considered, as Rose has suggested,¹¹ as profits on the investment in milk. Consumers pay fancy prices for cod liver oil, which contains vitamins A and D, and yet whole milk provides an adequate supply of vitamin A, and 1 quart of irradiated milk not only furnishes as much vitamin D as 3 teaspoonfuls of cod liver oil, but is more effective as an antirachitic, according to authoritative clinical studies.

All factors considered, milk at its present price, or at double that price, is an economical food, worth not 11 cents but nutritionally at least 18 cents a quart. The daily quart needed by every growing child, every expectant and nursing mother, and every undernourished person, and the daily pint for every other adult, is health insurance at a very reasonable cost. The quickest way that the cost of distribution of milk could be appreciably lowered is by a material increase in the national demand for our most nearly perfect food. Such an increase should be the goal of every progressive health official, who, while alert to safeguard the cleanliness and safety of the milk supply of his community, owes an equal duty to the public health to promote the greater consumption of pure, pasteurized milk and of the other salubrious dairy products. The solution of the dairy industry's present plight is not a decrease in production, but an increase in consumption.

SUMMARY

Although milk is recognized as our most important food, the consumption in this country is now far below the

acknowledged standards of an adequate diet at a reasonable cost for all the people. The consumption of milk in the United States should be increased at least 70 per cent.

Mass studies on milk consumption in various parts of the world have demonstrated the beneficial effects of higher milk consumption upon physical welfare.

The consumption of milk is influenced by such factors as the availability of clean and safe milk, the cost of milk, the purchasing power of the people, and the education and understanding of the public as to the unique value of milk in human nutrition.

The price of milk is affected by such factors as supply and demand, the demand not having kept pace with the supply in recent years, and the costs of human labor, which has been maintained at a high level during the depression.

The spread between the price paid to the farmer and that paid by the consumer is due to necessary costs and is not represented by profits to the distributor. The actual profit on each quart of milk sold generally does not exceed a very small fraction of a cent.

At its present price, or at double that price, milk is or would be an economical

food, giving a better return on the nutritional investment than any other food, or many combinations of foods.

The solution of the economic problem of the dairy industry is not through a decrease in production, but by an increase in consumption of milk and dairy products, an endeavor which deserves the active coöperation and assistance of all public health officials.

REFERENCES

1. Stiebling, H. K. A statistical analysis of the food requirements for the population of the United States. *J. Am. Statis. Assn.*, XXIX:186 (Mar.), 1934, Supp.
2. U. S. Dept. of Agric. *A Handbook of Dairy Statistics*, 1933.
3. Sherman, H. C. *Chemistry of Food and Nutrition* (4th ed.), 1932.
4. Leighton, G., and McKinley, P. L. *Milk consumption and the growth of school children*. Dept. of Health for Scotland. 1930.
5. Elderton, E. M. The Lanarkshire milk experiment. *Ann. Eugen.*, V:326 (Oct.), 1933.
6. Editorial. Milk and the growth of children. *Lancet*, Jan. 17, 1931, p. 145.
7. Orr, J. B., and Gilks, J. L. The physique and health of two African tribes. *Med. Res. Council. Spec. Rept. Series No. 155*. Gt. Brit., 1931.
8. Crumrine, S. J., and Tobey, J. A. *The Most Nearly Perfect Food*, 1929; Tobey, J. A. *Milk. The Indispensable Food*, 1933.
9. *Nebbia v. New York* (1934). 291 U. S. 502, 78 L. Ed. 563, 54 S. Ct. 505, 89 A. L. R. 1469. See Edit.: State control of milk prices. *A.J.P.H.*, Apr., 1934.
10. Spencer, L. *Dairymen's League News*, Apr. 24, 1934. Also: *Report of the Joint Legislative Committee to Investigate the Milk Industry*, New York. Leg. Doc. No. 114. 1933.
11. Rose, M. S. *Feeding the Family* (3rd ed.), 1929.

DISCUSSION

J. C. GEIGER, M.D., F.A.P.H.A.

Director of Public Health, San Francisco, Calif.

IN this discussion perhaps it would be best as a health officer that the discussion be confined to the aspects of wholesomeness and safety of milk.

Milk as a food and beverage was generally used among the ancients. Certainly, butter was used in India as early as 2000 B.C. Milk has a unique position in our dietary in that it is more universally used than any other

food commodity. As such, it has a most profound influence on the health of the people. It contains all the food elements, namely, fats, protein, carbohydrates, mineral salts, and vitamins. Therefore, as a so-called well balanced ration it stands supreme. If one desires to state it popularly, it has sugars and fat to warm you and to make you plump but not over-plump, protein to

give you strength, mineral to build your bones, and vitamins to stimulate growth.

In the United States, the production of milk has increased enormously. Likewise, the sanitary measures to protect its safety as a food have increased. The price to the ultimate consumer, however, for many economic reasons, has remained stable. It may be stated without fear of contradiction that making milk a political holiday has become unpopular and today we have the intelligent coöperation of the modern health officer, the producer, and the distributor.

There could be considered adverse and scientific periods in the production and sale of milk. Among these so-called periods was that of dilution with water, preservation with chemicals, tuberculosis, certification, pasteurization, and last but not least, abortion and Malta fever. Perhaps the most important periods are certification and pasteurization. The problem of tuberculosis apparently is being met, but the problem of abortion and Malta fever is at present obscured in a mass of detail that needs intelligent unraveling in order that practical preventive measures can be adopted.

One of the really important services to be rendered in conserving public health of any community is the provision of a safe milk supply. Such a supply will earn its dividend in a general low death rate, but particularly to be noted, in the death rate under 2 years. Moreover, a safe milk supply is a community advertisement to be stressed. Milk taken from healthy cows under sanitary conditions is usually comparatively free of germs. Unfortunately milk so produced is too often the exception rather than the rule. Therefore, dairy sanitation should begin at the source, the dairy farm.

Contamination with germs ordinarily begins with the act of milking and the

route to the consumer is fraught with possibilities of contamination which are many and varied and often dangerous. Consequently, proper pasteurization is a necessary requirement for the general milk supply. Pasteurization properly done never was intended to atone for lax sanitary methods. Neither should it give the dairyman a false sense of security in not maintaining a healthy dairy herd. As policy, all milk should come from healthy cattle. Again, each distributing district or area or city should maintain routine inspection of the dairy farms along with the inspection in the district receiving and pasteurizing stations and at the city railroad platforms in direct shipments. These examinations would consist of sediment, chemical and temperature tests, as well as those for color, odor, taste, and of the containers.

The health officer is actively concerned with safeguarding the supply against such infections as tuberculosis, typhoid fever, diphtheria, scarlet fever and septic sore throat. Pasteurization is greatly depended upon to do this. Another factor of safety can be added by not permitting milk to be distributed from farms where there exists a contagious disease, and the same rule applies to employees of pasteurizing plants. In fact, it is considered good practice to submit such employees to routine physical and laboratory examinations and to immunize them against certain communicable diseases.

The production of certified milk practically dates back some 30 years and should be the only raw milk permitted to be distributed. Tuberculin and possibly abortion tests of the herd and of any additions should be required semi-annually. The health officer should have such test records on file. Monthly physical examinations should be made of the dairy attendants along with such laboratory examinations as are considered necessary with immunization

against certain communicable diseases.

Pasteurization should be required for all milk, except that which is certified, sold in any city. There is no doubt that the merits of this process in safeguarding public health against milk-borne infection are thoroughly recognized. Pasteurization consists of heating milk to a temperature of not less than 145° F. and keeping it at that temperature for not less than 30 minutes. We cannot too strongly emphasize, however, that this process is not a substitute for sanitation or as a corrective for milk from diseased cattle. It must also be recognized that the control of proper pasteurization is to a great extent dependent upon the human element. The possibility of some mechanical defect is manifest and careful survey and continuous inspection of pasteurization plants are essential.

The Director of Public Health of San Francisco wishes to record the fact that he disapproves the present tendency of manufacturers to add measured quantities of vitamins to foods for commercial purposes. The insufficient and

incomplete scientific knowledge available at this time on the possible effects of the consumption of vitamin reinforced food products over indefinite periods fully justifies the attitude that caution should be observed in the use of such products. There is still considerable question, particularly concerning vitamin D, of what constitutes the proper dosage of vitamin concentrates in the various age groups. Any attempt to increase the sale of a food product, especially milk, by the addition of a substance whose value to the public health is still a controversial matter is indeed ill advised, since the final evidence, to be determined by research, has not yet been secured. Even if it is granted that the actual danger in the consumption of vitamin D milk is relatively minimal, there is as yet no definite and accepted information on the limits or margins of clinical safety. Under these circumstances it is believed that the administration of such products should be surely in the province of the physician and not in that of the commercial distributor or manufacturer of food products.

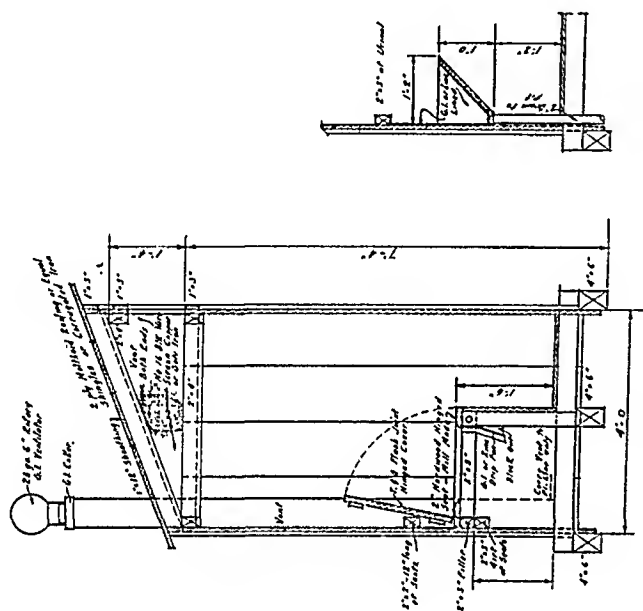
Medical Care in the United States

HOW are we situated in regard to the so-called services? About every fifth bed in hospitals (except those for mental cases) is vacant, while at the same time only half the people who need hospitalization can either get it in "charity" wards or buy it. A large percentage of our doctors and nurses are idle, while sick men everywhere are dying without receiving medical attention.

As a nation we spend \$3,250,000,000 for health, or \$26 per capita, whereas we should be spending \$42. In consequence, the death rate is in inverse proportion to income—the unskilled, poorly paid workers die at the rate of 1,440 per 100,000, while the skilled workers die at a lower rate of 829 per 100,000; managers and officials at 793, and professional people at the rate of 670.—*The New Republic*, Dec. 12, 1934.

MODERN VAULT TOILET FOR LABOR CAMP USE

THOMAS M. EDWARDS AND THOMAS E. PRING
Associate Architects, San Francisco, Calif.



URINAL

MODERN VAULT TOILET
FOR
LABOR CAMP USE

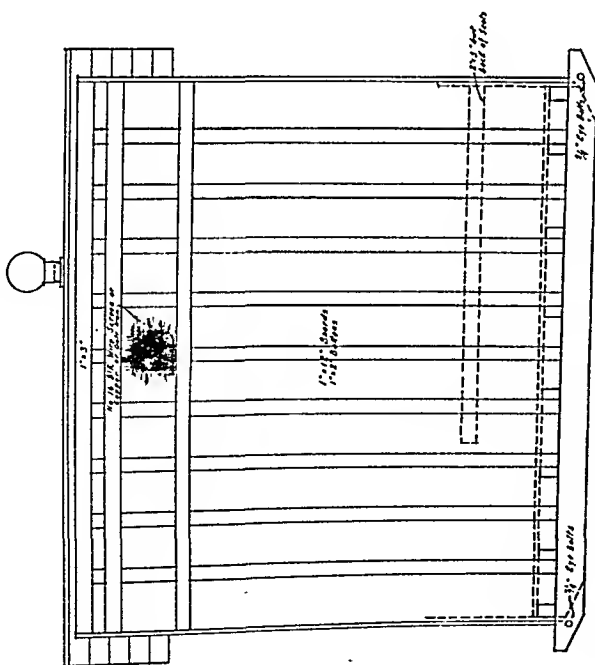
Designed by Division of Immigration &
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First Exhibited at Madera Co. Labor-
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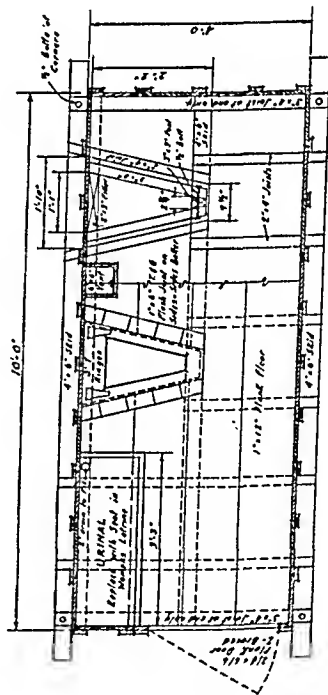
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June 23, 1934.



ELEVATION OF HIGH SIDE



PLAN

Pipettes for Use in Routine Sterility Tests

W. E. BUNNEY, PH.D.

*Associate Director, Bureau of Laboratories,
Michigan Department of Health, Lansing, Mich.*

THE pipettes described in this note are designed to facilitate the routine sterility testing of biologic products done in accordance with the regulations of the National Institute of Health. The pipettes have been in use for over a year, and have proved valuable not only in speeding up the actual testing, but in saving both time and material in the washing and sterilizing of glassware. They have an additional advantage in that the inoculation of fermentation tubes with the material to be tested is uniformly accurate.

The National Institute of Health regulations require that products whose human dose is 1 c.c. or less should be tested by the addition of 5 drops to one, and 20 drops to another of two fermentation tubes from each container tested. This requires a pipette graduated at 1 c.c. and 1.25 c.c. The regulations require further that products whose human dose is more than 1 c.c. be tested by the addition of 20 drops to each of successive fermentation tubes until the full human dose has been inoculated. If the human dose is 5 c.c. or more, only five fermentation tubes are inoculated with 20 drops each from every container tested. To meet these requirements, the pipettes described below and shown in Plate I were devised.

It was decided that a satisfactory pipette would have to meet the following requirements:

1. It should be free flowing. Too slow a delivery needlessly slows up the testing procedure. A minimum inside diameter of 1 m.m. was specified since the flow through a 1 mm. lumen was found to be satisfactory.
2. The pipette must be easy to insert through the neck of any final container to be tested and it must be possible to insert it far enough to reach the bottom of the container. For this reason a maximum outside diameter of 4.8 mm. for a distance of 75 mm. from the delivery tip was specified.
3. The pipette must not be awkward to handle. A maximum over-all length of 350 mm. was specified since a longer pipette was found to be unwieldy.
4. The pipette must be easy to read. In order to facilitate reading, all graduations were made in a complete circle about the pipette. A distance of 100 mm. from the plugged end of the pipette to the top graduation was specified so that the pipette could be held comfortably without the fingers obscuring the graduation.
5. The pipette should be easy to plug and there should be no danger of the plug sucking down into the liquid under test. An inside diameter of 6 mm. was specified for the mouth piece and a constriction to an

inside diameter of 1.5 mm. made at least 5 mm. from the mouth piece end. This gives room for a good sized plug and obviates any danger of its slipping down into the pipette.

6. The pipette should be made of resistant glass in order to reduce breakage.

The complete specifications are as follows:

- 5 c.c. pipette—graduated in c.c. to tip—length from delivery end of bulb—75 mm.
- Length from bulb to tip—75 mm.
- Overall length approx.—350 mm.
- O.D. (except bulb)—4.8 mm.
- Lumen, mouth piece—6 mm.

Lumen, del. end, not under 1 mm.

Constriction—1.5 mm. I.D. above bulb

Graduations—in 1 c.c. to tip, complete circles

- 1.25 c.c. pipette—Distance from plugged end of pipette to beginning of graduation—100 mm.

Constriction—5 mm. from plugged end to about 1.5 mm.

O.D.—4.8 mm. maximum

Diameter of lumen, del. end—not under 1 mm.

Graduations—at 1.25 c.c. and 1.0 c.c. points only—complete circles

Resistance glass

Emergency Nursery Schools

APPROXIMATELY 50,000 children are enrolled in the 1,600 emergency nursery schools which exist under the F.E.R.A. in 47 states, the District of Columbia, and Puerto Rico, according to Grace Langdon, Ph.D., Specialist, Emergency Nursery Schools. Through these nursery schools young children and their parents have derived many benefits since the time of their authorization in October, 1933. Children have found physical comfort and relief from the strain occasioned by overcrowded living conditions and worried adults. They have, day by day, learned those health habits fundamental to wholesome living. They have had the opportunity to play with others of their own age, and to learn the social habits that come from such play. Parents have learned how to provide better physical care for their children and how to guide

their behavior better. Many communities which heretofore knew little about nursery schools have seen the above mentioned services and are already laying plans for making nursery schools a permanent institution in the community, since they have demonstrated in some measure their function as a social agency.

In laying such plans care needs to be taken that only the best of the emergency program is preserved, and that in building for the future there is ever kept in mind the standard of what a good nursery school really is and that only the best is planned for any community. This points to the need of informing one's self concerning the standards for a good nursery school and passing on that information to the general public.—*Parent-Teacher News Release*. Jan. 25, 1935.

EDITORIAL SECTION

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VITAMIN D MILK

THERE is always something new coming up concerning milk. For a number of years it was chiefly the discussion of bovine tuberculosis and its transmissibility to human beings. The English and our Canadian friends are still struggling with this question which has come to the fore on account of investigations made within the last few years in those countries. In America the matter was threshed out some 30 years ago. To our Bureau of Animal Industry we owe our present excellent position in regard to this question. Pasteurization is now so general in our cities, at least, that cases of bovine tuberculosis in human beings are not common.

Next came the vitamins, and later the evidence that some, instead of being a single substance, carried several of these remarkable products. For the past 2 or 3 years the discussion has centered largely around the so-called vitamin D milks, and they are being urged on the public from a number of different directions, many of them entirely commercial.

Let it be said at once that there is no question about the fundamental facts involved, or the real value of vitamin D milk, properly prepared. The methods of making vitamin D milks and a discussion of them were published in this *Journal* in the issue of December, 1932, and since, editorials on the subject have appeared. There are three methods now in use for preparing vitamin D milk for the market: one by feeding cows irradiated yeast; one by irradiating the milk directly; and one by adding to milk a concentrate, usually made from cod liver oil (Zucker method). There is a fourth method—irradiating the cows—which need not be discussed here.

Each state and practically each city has laws regarding milk, with definitions of adulteration, pasteurization, modification, etc. A legal opinion has been rendered in one city allowing the sale of irradiated milk, but not vitamin D milk made

by the Zucker method, since it is forbidden to add substances to milk, but there is no prohibition against the use of radiant energy or the possible effects it may produce!

A recent report¹ discusses this question in what seems to us an eminently sane way, pointing out that the only milk which can be called "vitamin D milk" correctly is that produced by feeding cows irradiated yeast. Milk which is irradiated after being drawn should be called "irradiated milk." If the exposure is incorrect, there are substances in the milk which may be injuriously affected, and off-flavors developed, due probably to oxidization of fats or changes in the protein. It has been shown that there is some effect other than the change of provitamin substance into vitamin D, since skim milk can be activated. Indeed, skim milk, whey, and casein all contain sterol, but the lactalbumin has been found to contain a concentration which is more than half that of the butter fat, and that sterol so combined is more constant than that of the other milk constituents. The conclusion is that the sterol of the whole milk seems to be independent of the fat content.² Inquiries from a number of those supplying equipment and processes indicate there is no standard method applicable to the various types of equipment and apparatus. Recording ammeters in common use give amperage, but not ultra-violet radiation, though meters which record ultra-violet rays have been developed and others are being developed, but their practicability remains to be proved.

It will be remembered that Steenbock took out a patent on his irradiation method and turned it over to the Wisconsin Alumni Research Foundation, which has licensed a number of producers of evaporated milk. So far, clinical and experimental research on irradiated evaporated milk seems to be deficient. The foundation says that clinical studies have been conducted, but the results had not been published (July, 1934). The advertisements of various concerns manufacturing evaporated milk under license differ considerably. One states that the product is not offered as a cure for rickets, but as a reliable preventive of rickets for normal children. It seems impossible to reach any other conclusion than that the subject is still under study, and that much remains to be learned.

As far as the production of so-called vitamin D milk according to the Zucker process is concerned, the committee holds that the name is not correct, and that it comes distinctly under the head of "modified milks." The manufacturing of this product has been turned over to a company which is now putting the concentrate into cream, the object being to avoid the addition of an extraneous fat to the milk. Even this, however, will not overcome the legal objection to selling such milks under many of our existing laws.

Among the various bodies appointed to study this question generally is the Committee of the New York Academy of Medicine. After quoting an experiment to show that rats may be fed excessive quantities of vitamin D without injury, they say, "The advisability, therefore, of universal or general energizing of milk does not seem apparent." It is this point which we wish to stress, whatever form of fortifying is adopted. Reed³ has fed viosterol to 300 human subjects from 7 to 72 years of age, the doses ranging from 3,000 to 2,760,000 international units daily. Of these, 43 patients showed definite symptoms of toxic poisoning in varying degrees. He says that there need be little apprehension of poisoning through giving amounts ranging up to 150,000 international units daily for indefinite periods.

It requires pretty constant reading to keep up with the work which is being

done on the vitamins in general, and particularly vitamin D, during the last few years. As far as we can judge, those most competent to speak believe that there is much to be learned. If this is not true, many people are wasting money in useless experiments and study. However, the commercial interests have, as usual, taken hold of this idea and are pushing it. Even the Wisconsin Alumni Research Foundation is pushing it by methods which do not appeal to us. Their literature is apparently written by an advertising agent and abounds in short quotations which do not tell the whole story, though most are from those entitled to speak with authority. For example, one writer is quoted as saying, "The literature of the decay of teeth, osteomalacia, etc., gives definite evidence that vitamin D is necessary throughout the whole of life." This does not mean that any form of so-called vitamin D milk is necessary, though that is the implication, since there are many other sources of vitamin D available. The leaflet containing this statement is addressed to the medical and dental professions, but has been sent to a number of laymen.

In one pamphlet sent out late in 1934, statements are made which would indicate that this Foundation is working with the American Medical Association. It is true that the Committee on Foods of the A.M.A. has accepted a number of vitamin products, but they have also recognized the absence of clinical study and have set up tentative standards.

We do not wish in any way to be understood as objecting to the use of vitamin D milk. It does seem, however, perfectly clear that claims are being made for which there is no good evidence, despite which many so-called vitamin D products are being exploited by the milk industry and by patent and process licensors, and are being urged through the use of professional organization endorsement. We agree with the conclusion of the report from the A.P.H.A.—"Not until proper judgment and control of this entire matter is exercised by those having commercial, professional, and patent interests can it be expected that general confidence can be secured and the public given proper products scientifically proved to be of real merit or worth. Only by such method can exploitation of questionable products be prevented and legitimate products be accepted."

REFERENCES

1. Palmer, William B., *Chairman*. Report of the Committee on Milk and Dairy Products. *A.P.H.A. Year Book, 1934-1935* (Supplement to *A.J.P.H.*, Feb., 1935), pp. 62-68.
2. Sterols in Milk. Editorial, *J.A.M.A.*, July 21, 1934, pp. 190-191.
3. Reed, C. I. *J.A.M.A.*, May 26, 1934.

DR. THEOBALD SMITH—SCIENTIFIC PHILANTHROPIST 1859-1934

ON December 11, 1934, Dr. Theobald Smith, world-famous pathologist, died of heart disease at the ripe age of 75. His passing does not end his service to mankind, however, for the influence of his work will be immortal. He was a scientific philanthropist in the sense that his gifts in the form of new medical knowledge have added to the life span and health of multitudes, in addition to bringing vast economic savings to industry and agriculture.

Born in Albany, N. Y., in 1859, he received his first scientific degree, Ph.B., at Cornell, in 1881; and the degree of M.D. at Albany Medical College 2 years-

later. Some 11 universities conferred honorary degrees on him, and he was awarded 7 medals. He was a member of many learned societies in this country and abroad.

Dr. Smith's productive researches began early in life. Several of his most important discoveries were made during the period 1884 to 1895, while he was a young scientist on the staff of the Federal Bureau of Animal Industry. Two years after the beginning of his Government service, in association with Dr. D. E. Salmon, he made important contributions to the knowledge of bacterial immunity. These two scientists found, in 1886, that killed cultures of bacteria would protect animals against subsequent infection with the live organisms. Other investigators developed this knowledge into practical methods of immunization against many diseases. Later Dr. Smith and his associates, Dr. F. L. Kilborne and Dr. Cooper Curtice, studied the biology of the cattle tick. This brilliant trio of investigators proved that tick fever was transmitted solely through a living carrier of the infection, and not, as had been suspected, through mere contact with other animals nor from feed, water, or air. This discovery led to practical measures of controlling and eradicating not only tick fever, but many dreaded human diseases spread by insects and other parasites.

Turning his attention to tuberculosis, Dr. Smith demonstrated for the first time that the germs of the human form of this disease differed from those of the bovine form. At the laboratory of the State Live Stock Sanitary Board of Pennsylvania, it was shown that the bovine type of organism was transmissible to man—especially children.

Dr. Smith was a pioneer in the study of allergy (Theobald Smith's phenomenon), that curious sensitiveness of persons and animals to certain substances. His studies opened up a vast field of research relating to foods, drugs, and biological products.

All these discoveries subsequently led to improved scientific and practical means of safeguarding the health of man and domestic animals. In the later years of his life, Dr. Smith directed the Department of Animal and Plant Pathology of Rockefeller Institute for Medical Research. The results of his researches there also enriched various fields of scientific knowledge. Honored by many professional organizations and institutions, Dr. Smith belongs primarily to the people for whose welfare he so diligently, successfully and unselfishly labored.

LETTER FROM GREAT BRITAIN

ON SHINING EXAMPLES

One of the more common methods adopted by health officers and others engaged in the public service of this country of securing advance or the adoption of some particular scheme or measure is by crying out that it is in operation in some other country. In the pre-war days it was usually Germany that was chosen. Since the war almost invariably the shining example has been the United States, and one says, after the manner of Sterne, "this, that, or the other thing they order so very much-better in America."

In relation to milk, for example, the cry that our practice lagged very far behind the American was so very loud and persistent that tremendous activity developed, and now it is claimed for the milk supply here that it is every bit as good as that of the United States. One respect in which it is admitted with just sadness the British are still behind is in the matter of *per capita* consumption. The amount consumed by each member of the community works out at something ridiculously below half a pint. Even that, however, looks like being put right, and the legislature and everybody else will be much surprised and hurt if within the next year or two the people fail to show themselves a nation of milk drinkers, consuming considerably more than whatever is the maximum amount taken per head in any of the States in the Union. This is to be brought about as a result of a law which received the consent of the King at the end of last session.

MAKING A NATION OF MILK DRINKERS

This is known as the Milk Act, 1934, and among other things it provides for the grant from the national funds of large sums for expenditure on schemes

for improving methods of milk production and of increasing consumption. Incidentally it contains provisions under which school children may obtain milk daily in school for a purely nominal sum, the difference in cost being paid to the retailer through the Milk Marketing Board. This body, which was only recently established for the purpose of securing more equitable conditions for milk producers, particularly, and more even distribution of the article, has also as an aim popularizing and encouraging its wide use. The scheme of providing a cheap supply to school children the Board has taken up most enthusiastically, seeing in it a method of disposing of large quantities of surplus milk that might otherwise prove embarrassing. They welcome the scheme also—as must all who hold milk in high esteem on account of its nutritive qualities—because they believe that it will circulate the milk drinking habit and will insure an increase in the consumption of milk by adults and a raising of the per head figure to something of which no proud patriot need be ashamed and that will compare favorably with, or even overtop, that of America.

In the scheme prepared by the Milk Marketing Board it is provided that subsidy payments shall only be paid if the medical officer of health of the district in which the milk is distributed is satisfied as to the source and quality of the milk supplied and certifies accordingly. In certain areas, including the metropolis, pasteurized milk will be specified and for his half-penny—about one cent—the child will receive one-third of a pint in a capped bottle and a straw through which to absorb it. Already over a fairly large part of the country a voluntary scheme of supply has been worked for some years, so

that there should be no difficulty in putting the nation-wide scheme into operation in the schools this year.

HEALTH IN INDUSTRY IN 1933

The chapter on health in the report of the Chief Inspector of Factories and Workshops for 1933 is as usual contributed by Dr. John C. Bridge, the Senior Medical Inspector. Dr. Bridge, by the way, was recently created C.B.E. or, as the toast-masters describe it, "Commander of the most noble Order of the British Empire," in recognition of the value of the work he has done on behalf of the health of the workers. As always, from the point of view of health officers and others concerned in the preventive side of medicine, the health chapter is the most interesting of the several extremely interesting contributions to the report. On this occasion, so far as general health is concerned, Dr. Bridge finds himself able to report favorably.

Accidents, it is true, were numerous, but this was due to the fact that the numbers in employment were higher and many of those engaged having been off work for so long were, for a time, unaccustomed to the working conditions, machinery, and so on. In other directions the impression gained was that nothing but benefit came to the industrially employed from employment. In order to be quite sure, however, regular medical examinations are felt to be necessary. To these both employees and employers appear to be averse.

A note in the report on the effect on women of industrial work has received a great amount of attention, more especially since the conclusion reached is that, though there is an adverse side to industrial life for women, the general effect is "good—judging from some years of observation in factories—and getting better." Among items on the credit or beneficial side are "the stimu-

lating effects of the discipline and interests attendant on factory life during and after hours, with the higher standard of living that is the wage-earner's. Conditions in factories are, in general, as good and, in many cases, better than those of the workers' environment. The food available at factory canteens and clubs is good, varied and cheap. Factory life certainly raises the standard of personal hygiene among girls." On the adverse side the main effects upon the girls appear to be that "they age quickly; their apparent age is the elder sister to their baptismal certificates. Physical attraction is early attained and quickly lost." The reason given for this is that "women's work often begins when it normally ends. The house and dependents make their claims on the woman worker. Her work is never done."

INDUSTRIAL DISEASES

In the matter of industrial diseases it is noted that cases of poisoning with lead, arsenic, and other metals were fewer than in 1932, as were also aniline and carbon bisulphide poisoning. Anthrax cases, on the other hand, showed an increase, particularly among persons engaged in handling skins and hides, articles notoriously difficult to disinfect.

Special reference is made to the fact that the incidence of epitheliomatous ulceration "now the most menacing of all the industrial diseases that are notifiable," shows few signs of diminishing. Persons working with pitch and tar (in patent fuel works, etc.); with paraffin (in shale oil works) and mineral oil (in cotton mule spinning, etc.) are those chiefly liable. In addition, cancer of various parts occurring among persons working with certain dyes and chemicals and in such places as nickel refining works are giving rise to anxiety. Silicosis and asbestosis, as well as certain new forms of poisoning occasioned by the use of chemicals, many of them

complex in character, of the effects of which on the human subject little as yet is known, come in for special reference also. In the case of asbestosis it would seem that since the introduction of special regulations applicable to the asbestos industry, the problem has been solved. Silicosis and tuberculosis among persons engaged in sand-blasting seems likely also to be conquered in the near future since the discovery that results quite satisfactory may be obtained by substitution of steel grit for siliceous material as an abrasive. The impression obtained from the report is that eventually, in this country at any rate, the use of the latter will be prohibited, except under special circumstances.

DIOXAN POISONING

Among the new forms of poisonings occasioned by the use of complex chemicals, attention is specially directed to that due to the inhalation of Diethylene Dioxide ("Dioxan"). This substance, used in the manufacture of artificial silk for treating cellulose acetate silk yarn, in one instance led to the death of 5 men in one plant, the signs being severe gastric disturbance followed by acute hemorrhagic nephritis leading to suppression of urine, uremia, coma, and death. A most serious view was taken by the department of these cases and eventually the plant in which they occurred was closed and an undertaking given that no further work would be done necessitating the use of Dioxan until all means had been taken to insure safety of the working conditions. Experiments to determine the extent of the toxicity of the material and the precautions necessary to be taken are now in hand. Further, it has been arranged that before any of the new organic compounds now so widely used as solvents, etc., are put upon the market

they shall be tested physiologically for toxicity. Dermatitis among persons engaged in certain industries continues to attract attention and reference is made in the report to the measures of prevention likely to prove effective. One most valuable suggestion offered by Bridge is that there should be regular inspection of workers' hands by a careful observer. In this way, he holds, the necessary precautions are likely to be taken, early signs of skin irritations can be detected and relieved before the resistance of the skin breaks down.

LEGGE'S "INDUSTRIAL MALADIES"

While I am on the subject of industrial hygiene and diseases of factory workers, I should like to refer to a book published here by the Oxford University Press. Written by the late Sir Thomas Legge, one time Senior Medical Inspector of Factories, the work has been edited by Dr. Henry, a Medical Inspector of wide experience in the Factory Department. Sir Thomas Legge was one of the makers of industrial hygiene and, in his day, a recognized authority on industrial diseases. Evidence of the high esteem in which he was held in the United States is to be found in the fact that his work was as well known there as here and on several occasions he was called upon to deliver courses of lectures in American medical schools. The work contains chapters upon most of the industrial diseases and poisonings, as well as upon such matters as notification of industrial disease, compensation, and health and welfare conditions in factories and workshops. Authoritative and informative, Legge's work is to be counted an outstanding contribution to the literature relating to the hygiene of, and diseases associated with, industry.

CHARLES PORTER, M.D.

London

PUBLIC HEALTH EDUCATION*

Comic Strips 40 Years Old—1894 saw the birth of the comic strip. Have we noted the considerable proportion of non-comic strips as the years have passed? Adventure, science, and history have their share of the strips. Why not health? Why should not some of our clever health people devise an idea for real health information to appear in acceptable strip form?

Said *Editor and Publisher* recently:

Entertainment can be combined with more than a little education on the strip page and some artists are doing it well without any attempt to be funny.

"1,820 Ways to Avoid Monotony"
—This is the heading of a page advertisement of an advertising agency, Young & Rubicam, New York. Here is part of the text, the application to health education being left to the reader:

A certain New York business man lives at 58th Street and First Avenue, and has his office at 46th Street and Park.

One day while lunching with a mathematics instructor at Columbia, he chanced to comment on the monotony of his daily walks from home to office.

A few days later, he received a note from the instructor, containing mathematical proof that there were 1,820 routes between his home and his office, all of them different and all the same distance.

Is It Public Versus Private?—In some communities finances have aroused something of a "public versus private" competition for the approval of the public. Probably this arises in the relief field and is less likely in public health. At any rate those concerned with public welfare will wish to look

over the Dec., 1934, issue of *News Bulletin*, Social Work Publicity Council, 130 East 22d St., New York, N. Y. There is a section on what private agencies say about governmental service during money raising campaigns. 25 cents.

Why Not Immunize?—The Santa Barbara County Health Department reports on 355 children between 6 and 15 years old, none of whom had been immunized against diphtheria. The reported excuses from the 164 homes were classified as follows:

Lethargy: 51 (31 per cent), including such answers as: "I will next time"; "Too much trouble"; "All right—if the child wants it"; "Forgot to come."

Ignorance: 26 (16 per cent), including such answers as: "Too young yet"; "Already had diphtheria"; "Wait till exposed"; "Just another fad"; "Not afraid of diphtheria"; "We didn't have it when we were children"; "Never been sick."

Opposition: 84 (51 per cent), including such answers as: "Don't believe in it"; "Made neighbor's child's arm sore"; "Religious objection"; "Poisons the blood"; "Previous unpleasant experience"; "It would hurt"; "Don't like the idea."

Economic Reasons: 1, "Have lately moved here; was not given free where I lived."

Legitimate Medical: 3, "Child has been sick"; "Our doctor (chiropractor) advises against it."

Dr. R. C. Main, county health officer, comments:

It appears, therefore, that our failure to wipe out diphtheria completely is due, in large part, to opposition of the parents. We have learned, however, that this attitude of the parents is not unchangeable. Again and again, by the use of tact and a continuous educational program upon the subject, we have had parents apply for this protection for their children when they had previously bitterly opposed it. Indeed, many of the

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

children listed in this study have since been immunized.

In *Weekly Bulletin*, California Dept. of Public Health, Sacramento. Nov. 24, 1934.

The Demand for Reader's Time—
A writer addressing printers tells why printers must produce better printing so that more printed matter will be used.

Health agencies buy printed matter to get a hearing for facts and ideas and so they face these same conditions.

Printing in general is not as effective in producing results as it used to be. Why? The answer is to be found in changing conditions, which have brought about a more severe competition for the full attention of readers to whom each piece of printing is to be addressed.

If you want to discover the fundamental reason why printing of a given quality is not doing the job it did 10 years ago, just analyze how you spent your own time for the past 10 days. Schedule, day by day, how much time you devoted to reading *any* kind of printed matter. Deduct from that the time spent on the first page of the newspaper or on a new novel, and you will begin to get some measure of how much of your time is available to those who seek to address sales influencing messages to you through the medium of printed advertising.

Try this same analysis on friends and you will find a like situation. Fume though we may, the radio, the movies, the new streamlined autos, and many other attractions are appropriating more and more of the time formerly available for the reading of printed matter. The cozy evening spent under the lamp, with a variety of magazines, booklets, or pamphlets, is becoming the exception rather than the rule.

The author, Douglas C. McMurtrie, puts this question:

Is printing today as much better and more attractive than the printing we did 10 years ago as the popular-priced automobiles of the present season are improved in style and performance over those on the market 10 years ago?

Let health workers, as well as printers, face the facts:

Printing today, which seizes the few precious available moments of attention, must

be made outstanding in design to attract and to invite the eye. Your piece must be one among a dozen to demand and secure that attention, constantly harder to hold.

When we once get that attention, we must also make better use of it. This means attractive, lively pages, with type intelligently set, so as to interpret the copy story to the reader in crystal-clear fashion. Illustration must be vivid and graphic.

Among the practical suggestions offered, the following may apply to some health material:

There are possibilities in the reduction of size. Any booklet, set sloppily in an indifferent type face and printed on cheap and unimpressive paper, can often be cut a half inch in each dimension, set up with taste and care, and printed on a better quality and more suitable paper, at the same cost and with greater satisfaction to the customer.

When submitting a printing job as we have planned its specifications we may well ask the printer how he would plan it if he "started without limitations."—*Inland Printer*, 205 W. Wacker Drive, Chicago. June, 1934. 40 cents.

"Fight Tuberculosis with Modern Methods"—This, the slogan of the 1935 Early Diagnosis Campaign (EDC), seems the logical follow-up to the preceding campaign themes.

It takes time for new ideas to take root and patience to dispel deeply-rooted fallacies. Yet, we can greatly hasten the acceptance of sound, balanced knowledge through intelligent publicity. Fortunately, public interest in the newer technics of treatment plays into our favor. For these reasons, tuberculosis associations throughout the country have agreed during 1935 to concentrate their educational resources on treatment.

Some may feel that it is quite enough to urge people to go to the doctor and say nothing about treatment. They ask: "Why should the public be informed on treatment?" The first obvious answer is that misconceptions never do any good and it is our job to present the true and modern facts. Another is that an appreciation of scientific medicine is one of the major objectives of health education and the modern treatment of tuberculosis inspires a respect for scientific medicine. A third reason for selecting this theme is that a general knowledge of the treatment

of tuberculosis dispels, to a large extent, the fear of tuberculosis, and prompts the person who may be worrying about his health to go to a scientific doctor rather than to a cultist or to the drug-store. Add to these reasons the demand for a specific explanation of pneumothorax on the part of a limited but increasing number of patients (doctors find it difficult to describe to the non-medical person) and finally the advantage of building up strong public sentiment in favor of the sanatorium.

The weapons of the campaign are of a high order. Four 4-page folders are on dull finish paper, the cover a photograph bleeding four ways with title lines across top and bottom, and with uncrowded text inside. "Modern Weapons to Fight Tuberculosis" contains three times as much text. There are other publications, slides, posters, and motion pictures available. All local tuberculosis associations are supposed to have samples.

It is for the state and local health agencies to make the most of the excellent material provided and the impetus given by the National Tuberculosis Association.

The "Comforter" in Jamaica—
Says Mrs. Smith, in *Jamaica Public Health*, Kingston:

What will the Government be doing next to one's children? First, it's registering 'em as soon as they's born, just like they was so many thoroughbred cattle; then it's sending around a sanitary inspector to have you build a latrine which they say will keep off the bowel troubles and the bad fever; then it's taking 'em to have their hands scratched and be vaccinated so they won't catch de alastrim. Then they tells you to bwoil the milk and water for the little 'uns and not give 'em cerassee tea, and to clean their milk teeth and keep 'em fixed just the same as if they was their second teeth. And when they go to school they have to get their teeth fixed, and they sends 'em home when they get measles or the whooping cough or even the itch; then a man comes to give 'em Government pills to cure 'em of hookworms. And now they're blaming the comforter and say it causes de tb. What will come next? I don't take much stock in such unpractical ideas. I'll bet if de truth known I have

raised more picknies than that Bureau or the Government both put together. Five out of my 8 are living and doing well, except for coughs and colds, earache and toothache, and such natural ailments and ever' single one of them was raised with comforters to keep 'em quiet. Next I looks for de Legislative Council to pass a law indicting honest folks for having typhoid and other God sickness dem. Aunt Eliza Bush-Tea recommend de comforter; she say it keep de gums healthy and she say bush tea and sugar pap is good for babies, too. That Bureau ought to be doing something practical to benefit folks and leave off hadvocating so many high-falutin' ideas them don't have no experience with. That my say!

For the Sunday Newspapers—In July, 1934, Iowa State Department of Health started a special series of releases to the Sunday newspapers of the state.

"Public Health in Fiction" reviews "Silver Linings" a novel by Joseph McCord who made good fictional use of a public health situation, but whose factual material on typhoid was nearly all wrong.

"Can This Be True?" was a series of paragraphs about smallpox, early bath tubs, and other near or far facts or superstitions.

A December 30 release on "The 1934 Health Record" was based on the death records of the first 9 months.

Most of the series is prepared by Dr. J. H. Kinnaman, Division of Child Health and Health Education.

Hygeia for January, 1935—We find a new type of table of contents, each item with a concise descriptive paragraph. We may want to try it on a booklet or an annual report. Then there are articles on

Preventing heart attacks. Sex education for young children. Why condition the air? (Many reasons for it.) These teeth of mine (a new series). The new generation (by a champion). The making and unmaking of a quack (mail order diagnosis). "Occupational diseases" in children (not what it sounds like). Government's interest in violent and sudden death. Overcoming worry (measures

of habit control). Occupational diseases of musicians. Some obesity "cures" and "treatments" (fantastic claims). A.M.A. cheese decisions. Intestinal worms. Diseases of the eye. Tuna fish. Picture section (as usual). New books on health. Questions and answers. School and health: The dominant influence of the teacher. Health teaching in January. Hygiene and the use of the dictionary. Health lessons in a rural school. How shall we teach safety? New health books for teachers.

Help in Preparing a Teachers' Health Year Book—From the National Education Assn., 1201 16th St., Washington, D.C., comes this request:

The Department of Classroom Teachers of the National Education Association has in preparation a yearbook dealing with the health of the classroom teacher—physical and mental.

Please direct our attention to any published material that you regard as especially helpful in the field of teacher health. We would appreciate greatly the receipt of any pertinent materials not generally available in libraries, such as leaflets or mimeographed reports. If important research projects relating to teacher health are under way, please describe briefly what your organization is doing or let us know where to obtain the information.

We should be glad to have you refer to outstanding contributions from other sources.

Reply to Ivan A. Booker, Research Division.

Optimism Needs Correction—One of our special correspondents, reporting on observations at Pasadena, mistakenly mentions the recent passage of a mattress regulation in Baltimore.

Dr. Huntington Williams reports that

As far as I can find out, there has been no new regulations in this matter in Maryland since 1931, nor has there ever at any time been any regulation or law for the city of Baltimore as such.

This refers to "What We Noticed at Pasadena" in Dec., 1934, issue.

Das Wunder Des Lebens—Dr. Bruno Gebhard of the German Museum of Hygiene, has sent us the announcement of an exhibition called "Das Wunder Des Lebens," which is to take

place in Berlin from March 23 to May 5, 1935. The substantial booklet describing the exhibition is illustrated with strikingly colored and most original photographs and drawings.

Through pictures and text the human body is brought into relation to elements in nature, to outdoor life, to industry—to the whole of life. Keeping well becomes an exciting adventure.

Health Education in Massachusetts—A "Health Education" issue of *The Commonwealth*, Massachusetts Dept. of Public Health, July-Sept., 1934, provides a review of much of the thinking as to health education and its actual practice in Massachusetts. Several times we have given up the attempt to review these 72 solid pages of varied material. So much of it has a bearing in all parts of the country that copies sent to state and local health agencies should be carefully preserved and made available to all health workers in the state or community.

Here are some topics:

Prerequisites of a progressive health educator; health department bulletin; a local health association; what a large city health department does; in the Y.W.C.A.; a hospital dispensary; in mental hygiene; prenatal and postnatal letters and other printed matter; school lunch; demonstration or example by display; home-made posters and charts; exhibits; in the schools; supervisor of health education; classroom teacher; physical education; preparation or material for school use; junior high school course; the health forum (radio); visual methods.

Health Education in a Small City—This topic was presented at a joint meeting of Canadian Public Health Association with two other groups by Dr. D. V. Currey, Medical Health Officer of St. Catharines, Ontario.

Dr. Currey said:

... the further one enters this field of endeavor the more he realizes his opportunities and finds that no one method is entirely satisfactory, but that the combination of plans will give the best results. There is no doubt

that all public health teaching must be positive, nontechnical, and, above all, interesting.

He then discussed the practical use of public addresses, newspaper publicity, bulletins, pamphlets, motion pictures, exhibits, hospital day, direct to the home, parades, and broadcasting.

Health education of the public should be the most important duty of any health officer and should be part of every health program.

Each member of the department of health staff should continually be on the lookout for new ideas, new types of posters, etc., which may be used for the purpose of educating the public.

—*Canadian Public Health Journal*, 105 Bond St., Toronto 2, Ontario. Nov., 1934. 35 cents.

To Meet School Health Leaders in Europe—The Health Section of the World Federation of Education Associations is arranging a European travel and study tour in connection with the Federation meeting at Oxford, England, August 10-17, 1935. Leaving New York, June 29, the tour will visit France, Switzerland, Germany, Poland, Russia, Finland, Sweden, Denmark, and England. The group will meet the leaders in school health in each of these countries. For further information, write to the chairman of the Health Section, Professor C. E. Turner, Massachusetts Institute of Technology, Cambridge, Mass.

RADIO

The Massachusetts Dept. of Public Health radio program for Oct.-Dec., 1934, was in three sections:

"Health Messages," 4:30 p.m., Wednesdays, Station WBZ, papers prepared by members of Massachusetts Medical Society; "Health and digestion . . . Old age deferred . . . Appendicitis . . . Hospitals . . . Gall bladder trouble . . . Prenatal care . . . Anemia and its treatment . . . First aid . . . Protecting the school child from fatigue and strain . . . Abdominal pains . . . How surgery and advances . . . Angina Pectoris . . . Arthritis."

"Health Review," 1:30 p.m., Tuesdays,

Station WEEL, historical sketches by Eleanor J. Macdonald: Edwin Chadwick . . . The contribution of Edwin Chadwick to Public Health . . . Lemuel Shattuck . . . The report of 1850 . . . The report of 1850 continued . . . The 1869 Board of Health and vital statistics . . . The State Board of Health, lunacy and charity and the re-establishment of the State Board of Health . . . The State Board of Health . . . Massachusetts Dept. of Public Health . . . Water . . . Methods of obtaining water through the ages . . . Modern methods of obtaining a pure water supply . . . Pure water and filtration.

"Health Forum," 5:00 p.m., Fridays, Station WEEL, short topics requested by radio audience on health matters by Lila O. Burbank, M.D.

Recent broadcasts by Minnesota State Medical Assn. (Station WCCO, Tuesdays, 10:45 A.M.):

Diabetes in Minnesota . . . Blood transfusions . . . Progress in public health . . . Warts and moles . . . Encephalitis.

Station WIXAL is the short wave, non-commercial station, "dedicated to enlightenment." You will find it between DJC, Berlin, and GSA, Daventry. 6040 kc. For program address World Wide Broadcasting Corp., University Club, Boston, Mass. No health topics as yet, but we will expect them in due season.

Station W.H.Y. is the way station names are spelled, with periods, by some health and welfare workers. But in actual practice the form is Station WHY, that is, without periods.

SCHOOL HEALTH EDUCATION

A \$500 scholarship in health education, at Massachusetts Institute of Technology, 1935-1936, is available for women only. Write to National Tuberculosis Assn., 50 W. 50th St., New York, N. Y.

"A Project in Rural School Health Education," by R. E. Grout. Reprint from *Milbank Memorial Fund Quarterly*, 40 Wall St., New York, N. Y.

10 cents. Building the program in Cattaraugus County.

"State-wide Trends in School Hygiene and Physical Education," by J. F. Rogers, M.D., Office of Education. Revised. Supt. of Documents, Washington, D.C. 5 cents.

MATERIAL WANTED

E. Kohler, George Williams College, 5315 Drexel Ave., Chicago, Ill., writes:

Our class in health education at George Williams College is composed largely of teachers and leaders in social work. We are interested in any material available on health education and would appreciate having copies of any free health material you may have or lists of publications if free material is not available for all.

BULLETINS AND JOURNALS

"Know Your Health Department" is a series of brief sketches, with photographs of staff members. In *Birmingham's Health*, Birmingham, Ala.

Michigan Out-of-Doors is now *Health*, issued by Michigan Tuberculosis Assn., Lansing.

"Millions of Names" tells about the state registration of vital statistics. In *Weekly Bulletin*, State Dept. of Health, Sacramento, Calif.

Prize winning stories from the recent contest conducted by *Journal of Outdoor Life*, 50 W. 50th St., New York, N. Y., are being published in that magazine, starting with Dec., 1934, issue. 15 cents an issue.

Wolverine Health Bulletin, Michigan Tuberculosis Assn., Lansing, Mich., is issued for school room use. Monthly, two parts of 4 pages each.

A full-page picture of a child "bleeds" over all four sides of the page, on cover of the November, 1934, issue of *Everybody's Health*, 11 W. Summit Ave., St. Paul, Minn. 10 cents.

On the cover page of this issue of *Health* (in center of a big white space) appears the number 2,309,513,600, a sum almost too large for the mind to appreciate. This figure repre-

sents the number of heart beats that the average New Havener may anticipate during his lifetime under present conditions of living and based upon the life expectancy which is, at birth, a little more than 60½ years.

The above from *Health*, New Haven Dept. of Health, was followed by a brief application. A striking detail for a health bulletin, but we think that it would have been more effective if the explanatory paragraphs had been made more conspicuous. They were buried at end of an article not related to the cover-page figures.

FOR EDUCATION OR REFERENCE

"The Costs of Tuberculosis with Special Reference to the Adequacy of Medical Care and Treatment," by R. A. Seder. National Tuberculosis Assn., 50 W. 50th St., New York, N. Y. 35 pages. 20 cents. A study suggested by Committee on the Costs of Medical Care.

If there is a slum clearance movement in your city the leaders will be glad to receive from you a copy of "An Analysis of a Slum Area in Cleveland," prepared "with the counsel of Howard W. Green," of the Public Health Education Section, 1900 Euclid Ave., Cleveland, Ohio. 60 cents. Shows how much it "costs government and society to maintain a slum."

Julius Rosenwald Fund, 4901 Ellis Ave., Chicago, Ill., has 8 posters, 20" by 30", enlargements of the picture book charts on costs of medical care. Posters are sold for \$4.50, or will be loaned. A copy of the picture book is free.

"Mortality Experience of First Nine Months of 1934," and "Geographic Distribution of Mortality" in *Statistical Bulletin*, Metropolitan Life Ins. Co., New York, N. Y. Oct., 1934. Free.

"Protected from Harm" is a 4-page folder on diphtheria from the Milwaukee, Wis., Health Department. It is an effective straight-forward presentation emphasizing that "most of the

school children" and "many of the children below school age" have been protected. Please enclose 3 cents postage with a request for sample.

"A 'Recovery Act' for the Handicapped," by Edward Hochhauser, 71 W. 47th St., New York, N. Y. Values of the "sheltered work shops," Enclose 3 cents postage.

"Twenty-Five Years History of the Ohio State Sanatorium" is reprint of articles by R. G. Paterson, 72 S. 4th St., Columbus, Ohio. Enclose 25 cents postage.

Two chapters in "The Man with Bated Breath" are devoted to the physical and mental effects of smoking marijuana.

"What You Should Know about Tuberculosis" is a 30-page "handbook for tuberculosis patients." With substantial cover, good type, wide leading, and distinctive headings the pamphlet looks easy to read. Every right hand page carries a line cut which bleeds to the center and the top of the page. Obtainable through the national and other tuberculosis associations. You will want to know about tuberculosis when you see this pamphlet.

Good material for bulletins and other uses is offered in the Nov., 1934, issue of *Statistical Bulletin*, Metropolitan Life Insurance Co., New York:

The chances of celebrating a golden wedding (as well as tin and silver weddings); 3,000 persons killed annually in shooting accidents; insect-borne diseases can be eliminated.

If you have need for information about the Women's National Health Council write to National Health Council, 50 W. 50th St., New York, N. Y. The "Council" is promoted by L. Ellis Evons, advertised as a "professor, noted biologist and sexologist."

"Leprosy: Observations on Its Epidemiology in Hawaii," by U. S. Public Health Service. Dept. of Documents, Washington, D.C. 5 cents.

"Meat Dishes at Low Cost." U. S.

Dept. of Agriculture, Washington, D.C. Another contribution from the Bureau of Home Economics, Supt. of Documents, Washington, D. C.

A monthly clip sheet free, based on magazine articles, is supplied by *Hygeia*, 535 N. Dearborn St., Chicago, Ill.

"Out of Babyhood into Childhood." Children's Bureau, Washington, D.C. 8 page folder. Habits and care of the 1 to 6 year old. *Free*.

"Publications on Low Cost Diet." Revised edition of list of publications for reference and for distribution—for administrators, workers, clients. Social Work Publicity Council, 130 East 22d St., New York, N. Y. 10 cents.

"Reduction in Health Department Activities" is the "round table" subject in June and July, 1934, issues of *Municipal Sanitation*, 24 W. 40th St., New York, N. Y. Single copies, 25 cents. Many health officers answer 4 questions, and show how essential work is carried on despite decreases.

Reprints from *Journal of Social Hygiene*, 50 W. 50th St., New York, N. Y., at 10 cents for single copies:

"High Points of the Conference on Education for Marriage and Family Social Relations." 12 pages.

"Betrothal," by P. Popenoe. 8 pages.

"What Every Person Should Know About Milk," by L. S. Frank. Discusses: Why is milk such an excellent food, and how much of it should be included in the diet? How can milk be safeguarded to prevent it from transmitting disease? How can consumers be certain that milk they drink has been thus safeguarded? *Public Health Reports*, U. S. Public Health Service, Washington, D.C. Dec. 14, 1934.

NEWSPAPERS

"Smite the Mite" is an Iowa State Dept. of Health news release on scabies.

Vital statistics for 1933 were highlighted in a news release from the New

York State Dept. of Health, with this "lead":

Babies born in New York State today have a far better chance of surviving the first year of life than did those born 25 years ago.

"Efficient Health Service Safeguards People's Welfare" is a page-wide headline at the top of a special section of a holiday edition (Dec. 15, 1934) of *Hamilton Spectator*, Hamilton, Ont. Of special interest is "Mr. Average Citizen Hears about Hospital" in which "John Brown, one of Hamilton's younger business men" was struck by a car, and becomes acquainted with the hospital. Happily John had an inquiring mind, and all staff members who served him were on the job of informing the patient. Other cities might well use the idea.

An editorial and a cartoon in the same newspaper resulted from a recent news release. The news release was based on material in a current issue of *Health News*, New York State Dept. of Health. The subject was the decreased maternal death rate in the face of an increased birth rate. The cartoonist and the editorial writer served the *Albany Evening News*.

To understand that marvelous medium, the newspaper, which plays so large a part in adult health education, one needs to visit a newspaper plant. An illuminating supplement to an actual visit to any newspaper is "News: The Story of How It Is Gathered and Printed," issued by the *New York Times*, West 43d St., New York, N. Y. By picture and text this pamphlet will make clear much that is not obvious in the personal visit to a newspaper office. *Free*.

WHAT OTHERS HAVE DONE

The holiday spirit, Christmas, and New Years were utilized by bulletins,

news releases, and special cards from various departments and associations.

Several state-wide Home Hygiene Days were sponsored in recent months by the American Red Cross. *The Red Cross Courier* suggested that store window demonstrations be featured.

"Scientific Eating Campaign at Stephens College," by T. Rose. *Journal of Home Economics*, 101 E. 20th St., Baltimore, Md. Nov., 1934. 30 cents. Plan for "Scientific Eating Week" in a college.

"Cancer Prevention Week in Quebec," by Dr. E. Couillard. *Canadian Public Health Journal*, 105 Bond St., Toronto 2, Ontario. Sept., 1934. 35 cents.

In the exhibition the technic of microscopic examination of tissues was suitably demonstrated in the following manner. The visitor, after being shown a microscope, was directed by an arrow to three excellent displays of micro-photographs, in natural colors, of cancerous lesions, including lesions of the central nervous system, various organs, the bones and skin. These micro-photographs, on glass, were illuminated, permitting of examination as transparencies. . . . Gross pathological specimens of cancer were exhibited in the center of the room, showing lesions of all the organs of the body. Special attention was paid to the arrangement of this portion of the exhibit, so that lay persons might better understand the nature of cancer. . . . The visitors were conducted through the exhibit by physicians from the university hospitals.

The widespread distribution of blotters and cards was a feature of the week. The advertising cards, whether large or small, the blotters, and the other literature presented an allegory of cancer, which was represented by the figure of a crab. In this picture the crab, in striking green or red color, casts its shadow ahead, but its forward progress is impeded by a sword, the symbol of surgery, and by a lightning-like ray, a symbol of electricity and radium. Two crabs of gigantic proportions adorned the side panels of the entrance to the hall. Constantly used in the advertising and publicity was the message, "Kill Cancer before it Kills You," conveying in a striking manner the keynote of the "Week"—the prevention of cancer deaths.

BOOKS AND REPORTS

American Medicine—By Henry E. Sigerist, M.D. New York: W. W. Norton & Co., Inc., 1934. 436 pp. Price, \$4.00.

There is a certain satisfaction in finding a book by a prominent author which one can safely advise one's colleagues it is not necessary to acquire. In this instance the reason is simple, and inherent in the fact that while there is some history in certain chapters, the bulk of the volume is a digest of recent, or at least contemporary, publications, quite familiar to physicians and others reasonably well read in the professional, social, educational, and preventive aspects of medical art and science. *American Medicine*, in 286 pages, was written for German consumption, and while doubtless quite appropriate for that purpose, constitutes something of a surfeit in its translated form.

One is led by the jacket to anticipate a formidable treatise: "The rise and progress of American Medicine from the earliest times to the present," and, knowing the traditional thoroughness and meticulous methodology of such masters of history as Sudhoff and Harrison, to search for nuggets of newly mined gold of real merit from their colleague and pupil, the junior historian, author of this volume.

In the introduction we are told that "four years of intensive studies" went to the product of this book, and on the last page we read, "This book kept me busy for four years," and yet we find that the author first visited this continent in September, 1931, and the text after completion in German in the winter, 1932-1933, was translated with-

out change, other than minor corrections, by May of 1934.

We have read Dr. Sigerist's *Great Doctors* and *Man and Medicine*, and hope we may have in due time *Russian Medicine*, which he announces, but it was hardly worth while to offer to physicians in the United States quite so large an aggregation of medical abstracts in so casual a descriptive form as this *American Medicine*.

Of the 9 chapters, the first 3 on the Indians, the discovery and conquest of the Americas, on the colonial settlements and their separate and characteristic hardships, and on the United States down to date, give us a pleasant sketch, as it were, gleaned from John Fiske, George Trevelyan, and James Truslow Adams, and quite in the best manner of a good school book, and quite picturesque as a background for the "Pioneer" chapter which follows.

While regional and provincial preferences might differ, there will be general unanimity of belief that the 11 physicians picked as our profession's pioneers are well chosen, from Morgan and Rush, through McDowell, Drake, Beaumont, Gross, and Sims, to the giants of our day, Holmes, Mitchel, Billings, and Osler. This is a good chapter and shows a sincere appreciation based on wide reading and much listening. One searches in vain for references to the story of great physicians well known of in our neighbors' Dominion.

Some explanation of a quite understandable predominance of illustration from the now well-worn story of Johns Hopkins appeared necessary, even to the author, for we find on page 146, "I

shall give the greatest space to describing the set-up of Johns Hopkins University, not only because I am most familiar with it, but because I have the impression that there has been found the most successful solution." We may wonder whether always, and in the continuing product, the verdict of the future will be the same as to solution.

The gist of chapter 5 is a general reflection of the Flexner and subsequent A.M.A. Council reports. As a contemporary visitor telling his home folks what he read or heard in the United States, it is brief and to the point. In the 34 pages of chapter 6, we are led hurriedly through the Rappleye and the Committee on Costs of Medical Care reports, stopping briefly to touch on distribution of physicians, group clinics, costs, insurance, the A.M.A., and the medical arts. Similarly, in chapter 7, we skip along with short comments on hospitals, old and new, the American College of Surgeons, hospital finances, social workers and nurses, all of which take but 25 pages.

Preventive medicine in America requires 36 pages to deal with city, state, and federal health services, often ignoring important origins, dating Child Hygiene as late as 1915, and then giving a passing word to a few communicable diseases, the White House Conference on Child Health, sterilization, mental hygiene, and periodic health examinations.

The last chapter devoted to Medical Science leads to the conclusion that "The beginning of the place of the United States in Medical Science was in 1893 when at Johns Hopkins Medical School was established a scientific center of first rank, and with it a beginning of organized research."

New Yorkers must forget their Prudden, Delafield, and Park, and other cities their scholars of other years, in the face of the above authoritative opinion!

The translation of *American Medicine* for sale in this country would seem to add little to the convenience or the substance of contemporary publications.

HAVEN EMERSON

Dynamics of Population—By Frank Lorimer and Fredrick Osborn. New York: Macmillan, 1934. 461 pp. \$4.00.

Dynamics of Population is divided into four parts:

Part I, Population Trends of American Groups, covers the trend of the total population and reproduction trends by race, nativity, occupation, and economic status. The conclusions of Part I state that there is no marked difference in the net reproduction rates between whites and Negroes, whereas there seems to be high fertility in the other racial groups: Mexicans, Japanese, Chinese, and American Indians. There also seems to be a tendency to lowered fertility as "foreign" groups become "native," that is, after the second generation in this country. Once the foreign group adopts the American customs the problem of fertility becomes regional or social.

Part II, Measurable Characteristics of American Groups, deals with the variation in physical development and health of American groups, the variation of cultural-intellectual background among racial and regional groups, and groups classified by occupation and social status.

Part III, Influence of Differential Reproduction on the Characteristics of the American People, covers the social and biological influence on fertility. The conclusions on this section state that, at present, there is a negative association between fertility and cultural-intellectual level which if allowed to go on, threatens to defeat the aims of the whole public educational movement. A slight increase in the reproduction rates in the higher intelligence group and a

correspondingly slight decrease in the reproduction rate of the groups with lower than average intelligence would materially decrease the number of feeble-minded and increase the number of individuals of higher intellectual capacity. At present this is just the opposite.

Part IV, *The Causes and Control of Population Trends*, covers the physical, medical, social and economic factors affecting fertility and a discussion on the possibilities of social control. In groups with a high standard of living and a knowledge of contraceptive methods, there must be social conditions that are very favorable to fertility to keep the group self-replacing. It was also found that higher education of women tends to delay marriage but education is not a factor in lowered fertility among married women. There is, however, a negative association between full-time gainful occupations for women and fertility.

In conclusion the authors state:

Population trends have run their course in the past with little attention by anyone to their momentous influence on human destiny. Variations in fertility, although immediately controlled by individuals, are indirectly determined by particular social factors. It is evident that the social conditions which affect reproduction might be modified in a number of ways, so that the dynamic influences of population change would be more in line with conscious social objectives. Eventually, if our dream of human progress is to be realized, rational social action must replace the operation of blind forces in this as in other fields. In the furtherance of this ideal there is need both for more exact science and for a larger appreciation of the possibilities and values of human life.

There are a great number of charts and tables throughout the text—126 tables and 54 charts, all of which are from reliable sources. The book is well indexed and includes a glossary and complete bibliography which will be of particular interest and help to students of sociology.

E. J. CROSS

An Activity Analysis of Nursing—

By Ethel Johns and Blanche Pfeferkorn, New York: Committee on the Grading of Nursing Schools, 1934. 214 pp. Price, \$2.00.

This book reports one of the projects recommended by the Committee on the Grading of Nursing Schools to be listed on the Five-Year Program adopted in 1926. The committee felt that before nursing schools could be assisted in preparing good nurses, it needed to discover what good nursing is and how it can be taught.

The first chapter tells us what good nursing is, and is a classic. The information in it may be put to many uses. The great variety of men in all occupations invited to make commencement addresses in nursing schools can obtain here a fine background for writing their papers. Those physicians ever with us who still think nurses are receiving too much education to be useful will get an eye-opener.

The analysis which follows the first chapter is a revelation. It was time someone did a little research to find the depth to which the teaching of the fundamental sciences to nurses should be carried. In Chapter VII a possible technic is suggested which may prove useful as a practical demonstration of the direct relation to actual nursing procedure of the technic of science. For this purpose attention is concentrated on pneumonia for the disease, and anatomy and physiology for the subject taught.

One becomes a little more thoughtful about nursing as he reads the list of 12 nursing aspects which were selected for classification as they relate to conditions requiring nursing care in the hospital and community.

Although this book is most valuable to those interested in teaching and making the curriculum for nursing schools, there is meat in it for all in any way concerned with good nursing.

The book is written in a scholarly manner and is a really scientific book, in our opinion. EVA F. MACDOUGALL

The Adolescent in the Family: A Study of Personality Development in the Home Environment—Publication of the White House Conference on Child Health and Protection. New York: Appleton-Century, 1934. 470 pp. Price, \$3.00.

This volume presents the report of the Subcommittee on the Function of Home Activities in the Education of the Child, of the White House Conference on Child Health and Protection. Its format and method of presentation is similar to other publications appearing in this series.

A serious attempt is made "to obtain a picture of the present-day American family functioning as an environment for child development." The study was based upon carefully prepared questionnaires obtained from 13,000 public school children of junior high school age, about 8,000 of whom were selected for detailed study. Several hundred teachers contributed to the study by filling out a rating scale for each pupil.

Part I compares white American, Negro, and immigrant children from the standpoint of rural and village life. Such factors as socio-economic status, the broken home, social isolation, religious training, confidential relations between parents and children, etc., are considered in the light of the data obtained.

Part II considers the personality of the child and the family background, taking up the status of the family, family activities, health regulations, sex education, types of successful and unsuccessful families, and parent-child relations, and family education.

The appendix is replete with detailed comparative tables, a thorough discussion of the methods used in the study, and copies of the questionnaires. One

of the most valuable parts of the book is the number of case histories scattered throughout the text to illustrate various phases of the subject.

Two the findings stand out clearly and may be mentioned here:

The externals of home life, like its economic status or its housing arrangements, while important, are not nearly so significant for personality development of the child as are the subtler and more intangible aspects of family life, such as affectionate behavior, relations of confidence, inculcation of regularity in health habits and reactions to the illness or nervousness of parents. . . .

The average level of family relations and of personality adjustment of the children is somewhat higher for urban than for rural children. . . . If it stands the test of further inquiry, it indicates the validity of the assertion that the loss of certain economic and other functions from the home makes possible the more harmonious organization of family life upon a cultural and affectional basis. It may also show the result of the greater effect of child study and child care movements in the city than in the country.

One cannot read this volume thoughtfully without being impressed with the profound changes which have come over the American home in one generation. Many of our present-day socio-economic problems are closely lined with adolescent-child-family relationships and an intimate knowledge of these should help us in making the new adjustments necessary. RICHARD A. BOLT

The Advance of Science—Edited by Watson Davis. New York: Doubleday, Doran, 1934. 400 pp. Price, \$3.50.

It would indeed be a bold man who attempted a critical review of this book. It covers subjects ranging from the cosmic ray and the smashing of the atom to evolution, race betterment, and human behavior. There may be individuals who are competent to speak knowingly on all of the subjects treated, but the reviewer is not. The editor, who is in constant touch with all the leading sources of scientific knowledge

in this country as well as Europe, has called to his assistance upward of 60 specialists to whom he has given credit for coöperation and advice. The names are a guarantee of the accuracy of the statements made.

Even those who keep in touch with the advancement in science will be astonished at what has been collected within the 390 pages of text. It is well written in an interesting manner, and is therefore easy to read, even though some of the subjects discussed are very abstruse. There are useful tables giving the glands and their hormones, the vitamins as far as known, and other subjects which are being mentioned more and more frequently in the daily press.

The book is abundantly illustrated, though some of the illustrations appear to the reviewer to be misplaced. For example, it is hard to see why the photographs of lightning, electric sparks, spectrum of a meteor, or a mercury boiler drum should be put under the head of *The Fight Against Disease*. We judge that this is economic, as space on these same pages is given to the new giant X-ray tube and the picture of Johnny who roller-skated just after his first birthday.

There is a glossary of new words in science, some of which do not seem to be new enough to find a place in this book. A table of Atomic Weights, the Metric System and its conversion into the English system, comparison of the thermometer scales, and diagrams of the Heavens in several seasons of the year are given. The book is a mine of information and should be welcomed in every library and by all readers. The volume ends with a good index which assists greatly in its use.

We can only add that it is with a good deal of pride we note what has been done in America. It is not too much to say that American scientists are now the equals of those in any part

of the world. We back this statement by calling attention to the Americans who have won the Nobel prize in the last few years. MAZÏCK P. RAVENEL

Human Nature. A Guide to Its Understanding—By Judson Rea Butler. New York: Greenberg. 174 pp. Price, \$2.00.

This book aims to be a guide to the understanding of human nature. It is written in a style which is interesting, and numerous examples facilitate understanding by the layman. Varied topics are included in an extensive discussion of the partial identity principle, by which "Any part of a situation which causes a definite act may later call forth the same response, either in whole or in part." Subjects range from child training to mental hygiene, from habit-control to hypnosis. IRA V. HISCOCK

Medical Diseases for Nurses—By Arthur A. Stevens, M.D. and Florence Anna Ambler, R.N. (2d ed.) Philadelphia: Saunders, 1934. 513 pp. Price, \$2.75.

This book has the earmarks of a successful text. It represents the joint thinking of a physician and a nurse. It is written simply and directly, without any superfluous words and with excellently marked headings. The lack of illustrations does not seem to detract from its value.

Pneumonia which according to *An Activity Analysis of Nursing* seems to be one of the most frequent diseases to need nursing care both in hospitals and in the community, is given a great deal of attention.

As in the old edition, each disease is treated under the following captions: definition, etiology, symptoms, pathology, complications, prognosis and treatment. There is not an omission anywhere, and all details are treated clearly.

Our only criticism is of a paragraph

dealing with the nursing care of tuberculosis which says "During the night all windows should be wide open no matter how cold it is or how stormy." We feel that in the best tuberculosis hospitals today there is not nearly as much emphasis on cold air. Some of the newer tuberculosis hospitals are even being built several stories high, with hardly any balconies—the buildings resembling hotels.

It seems that with so much emphasis as is being put on prevention, a paragraph on how to prevent each particular disease might be inserted. This is covered somewhat under Etiology, but on the negative side.

We recommend this book and shall keep it close by to draw on both in our professional relationships and in those personal ones in the home and among our friends. EVA F. MAC DOUGALL

Rules for Recovery from Tuberculosis—By *Lawrason Brown, M.D.* Philadelphia: *Lea & Febiger*, 1934. 275 pp. Price, \$1.75.

In the treatment of tuberculosis the good doctor teaches the patient to help himself. Dr. Brown's book, designed specifically for the tuberculous patient, was perhaps the earliest of its kind. It grew out of his practice of conducting a "question box" hour for the patients at Saranac Lake. For years it has been a best seller. Patients by the thousands have read and re-read it and kept it for reference. Its kindly, cheerful tone and a certain charm of style have won for it the designation of the tuberculosis patient's bible. The 6th edition is a complete revision, which adds about 30

pages. Special attention is given to collapse therapy, after-care, and social readjustment of the patient. The vaccination of children to prevent tuberculosis, a discussion of special diets so much written about lately, the use of alcohol and tobacco, also receive emphasis.

The book is compact in size, printed in large type and has a bibliography and a good index. H. E. KLEINSCHMIDT

The Art and Principles of Nursing—By *Amy Elizabeth Pope, R.N., and Virna M. Young, R.N.* New York: *Putnam*, 1934. 832 pp. Price, \$2.75.

Section I, 662 pages, of this text deals specifically and definitely with the technic of professional nursing. In addition to the topics usually discussed in texts in this field, it has a chapter on Hydrotherapy and Heliotherapy, and one on the various tests so much used in modern medicine as a means of diagnosis.

The discussions and descriptions of technics are done carefully and concisely. They contain not only directions as to the technic itself, but as to the equipment needed, the reasons for precise procedures, and the precautions to be taken in special types of cases.

Section II is devoted to a discussion of diseases, types, causes, and special nursing care.

This text is evidently based on experience, is interestingly written, and concise. It is well worth the careful study of nurses, and, since it indicates the standard nursing procedure in various diseases, might well be read by physicians.

CHARLES H. KEENE

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Practical Prenatal Hygiene—Nine methods of approach the public health nurse may use in maternity case-finding.

ANON. Maternity Case-Finding. Health News, New York State Department of Health 11, 49:194 (Dec. 3), 1934.

The Doctor and the Public Health Nurse—Reiteration of the fact that organized medicine does not know the public health nurse and why. Yet the relationship between the medical and nursing professions is recognized by leaders in both groups as the most important factor governing the success or failure of a public health nursing program.

BLUMENTHAL, R. W. Organized Medicine and the Public Health Nurse. State Board of Health Bulletin, State of Wisconsin, 5, 20:3 (Dec.), 1934.

Vitamin Milks—Milk fortified with vitamin D is a valuable way of administering the needed vitamin to infants, to expectant, and possibly to nursing, mothers. That it is of value to normal adults or that it may have undesirable after-effects, only time will tell.

BUNKER, J. W. M. and HARRIS, R. J. The Clinical Status of Vitamin D Milks. New Eng. J. Med. 211, 25:1140 (Dec. 20), 1934.

For the Better Diagnosis of Syphilis—A scheme, by which blood samples will be sent to serologists who have developed diagnostic tests for syphilis, has been undertaken to appraise the various modifications of complement fixation methods and flocculation tests.

CUMMINGS, H. S. *et al.* The Evaluation of Serodiagnostic Tests for Syphilis in the United States. J.A.M.A. 103, 22:1705 (Dec. 1), 1934.

About the Phage—In this review of the bacteriophage phenomenon, while dealing largely with therapy, the value of which the authors seem to doubt, the bacteriologic and immunologic parts of the discussion will be of interest to sanitarians.

EATON, M. D. and BAYNE-JONES, S. Bacteriophage Therapy. J.A.M.A. 103, 23:1769 (Dec. 8), 1934.

Milk Safeguards—Facts that the public should know about milk (with which every sanitarian must be familiar) include, of course, the discussion of an adequate milk control ordinance. Consumers are stimulated to see that theirs equals the U.S.P.H.S. Standard and that it is enforced.

FRANK, L. C. What Every Person Should Know About Milk. Pub. Health Rep. 49, 50:1505 (Dec. 14), 1934.

Evidence of Brucella Infection—In those departments of packing plants in which cows are slaughtered, as high as 80 per cent positive reactions for brucella infection were found among the workers, although no histories of frank undulant fever could be elicited. Some cases did occur among those working with hogs. The incidence of the allergic state varied with the length of employment.

HEATHMAN, L. S. A Survey of Workers in Packing Plants for Evidence of Brucella Infection. J. Infect. Dis. 55, 3:243 (Nov.-Dec.), 1934.

Bed Rock Public Hygiene—The essentials of adequate public health administration, so familiar to sanitarians, are set forth briefly and convincingly.

HISCOCK, I. What Is an Adequate Health Program? *New Eng. J. Med.* 211, 25:1153 (Dec. 20), 1934.

Food-Borne Streptococcic Poisoning—Green-producing streptococci isolated from an offending cream pie yielded a filtrate causing typical symptoms of food poisoning when fed to monkeys. Green-producing streptococci from other sources like infected teeth and feces likewise produced toxic filtrates.

JORDAN, E. O. and BURROWS, W. Streptococcus Food Poisoning. *J. Infect. Dis.* 55, 3:363 (Nov.-Dec.), 1934.

Breast Milk Distribution—How breast milk is collected and dispensed to babies needing it in New England is told in the first of two papers. How the supply and demand is controlled and met will be told in a succeeding paper.

KEENE, H. M. Maternal Milk Collection. *Pub. Health Nurs.* 26, 12:649 (Dec.), 1934.

Rheumatic Fever in Children—Children's hearts are especially susceptible to rheumatic infection, and heart disease in patients under 20 is rheumatic in origin. Treatment can prevent permanent damage.

LYON, J. A. Rheumatic Heart Disease in Early Childhood. *New Eng. J. Med.* 211, 26:1185 (Dec. 27), 1934.

"They Shall Not Starve"—Another paper indicating that average weights of children in 1934 do not differ significantly from pre-depression averages. Evidently, in the district surveyed, the children of the poor were fed enough at least to grow at the usual rates.

PALMER, C. E. Further Studies on Growth and the Economic Depression. *Pub. Health Rep.* 49, 49:1453 (Dec. 7), 1934.

Perhaps You May Know all about This—Of no immediate importance to sanitarians, but still most interesting is

this observation: some red blood cells have hair-like processes which exhibit a rapid whip-like motion. They may be retracted back into the cell or they may be broken off to continue their motion for a while after being detached. Later they may take on a beaded or granular appearance. The method of staining to show this phenomenon is described.

OLIVER, W. W. Staining of the Processes (Flagella) of Human Erythrocytes. *J. Infect. Dis.* 55, 3:266 (Nov.-Dec.), 1934.

Buying Medical Services—A whole issue of the *Survey Graphic* is given over to discussions of social medicine by an economist, a publicity man, physician, surgeon, dentist, nurse, hospital superintendent, a sanitarian, and others. An inclusive collection of essays useful to proponents of group payment for medical services.

ROSS, M. The Issue of Health. *Survey Graphic* 23, 12:581 (Dec.), 1934.

Colds vs. Vitamins—Vitamin A, the so-called "anti-infective" vitamin, has no effect upon the incidence or severity of colds. This bit of research will hardly dampen the enthusiasm of the advertisers, however. It is doubtful if anything will.

SHIBLEY, G. S. and SPIES, T. D. The Effect of Vitamin A on the Common Cold. *J.A.M.A.* 103, 26:2021 (Dec. 29), 1934.

Whither Mankind — Reviewing population trends and possibilities in the United States and other countries, the author shows that the population saturation point is placed too low and that the tropics are the goal of the white. He concludes that perhaps "the meek will inherit the earth" after all.

SMITH, W. D. World Population. *Sci. Month.* 40, 1:33 (Jan.), 1935.

Guiding Their Food Selection—School nurses who are asked to assist teachers and school administrators in suggesting better ways to manage school

lunch rooms can get some very practical points from this article.

SPALDING, M. School Lunch Survey. The Commonwealth, Mass. Department of Pub. Health 21, 3:156 (July, Aug., Sept.), 1934.

Cohesion in Nursing Education—How the State Nurses' Association, the State Board of Nurse Examiners, the State Medical Association, the State Department of Health, and the State Tuberculosis Association did some brain work in helping to prepare over 150 unemployment relief nurses to do public health work.

TEAL, H. Indiana's E.R.A. Nursing Institutes. Am. J. Nurs. 34, 12:1158 (Dec.), 1934.

Smallpox. Diagnosis and Immunity—This detailed discussion of the whole field of "pock diseases," 60 pages long, introduces a vaccinia-variola flocculation test both specific and delicate; an anteserum is described with which passive immunity may be provoked and which may be of value in sensitizing living vaccinia.

TULLOCH, W. J. The Serological Diagnosis of Smallpox and the Laboratory Investigation of Vaccinia. J. State Med. 42, 12:683 (Dec.), 1934.

Cancer Control Deficiencies—Surveying the cancer experience of a hospital in a large city, the author recommends more educational campaigns, better diagnosis, and the establishment of a division of cancer control in the State Department of Health.

WILD, W. F. A Survey of Cancer Cases in the Hospitals of Bridgeport, Conn., 1928-1932 Inclusive. Am. J. Cancer 22, 4:878 (Dec.), 1934.

Experiments in Encephalitis—Serum studies are reported that show the St. Louis type encephalitis is distinct from other forms of encephalitis and poliomyelitis.

WOOLEY, J. G. and ARMSTRONG, C. The Distribution of Immunity Against Encephalitis Virus of the St. Louis Type in the United States as Determined by the Serum Protection Test in Mice. Pub. Health Rep. 49, 50:1495 (Dec. 14), 1934.

BOOKS RECEIVED

DR. BUNDESEN'S DIET BOOK. The Safe Way to Reduce. By Herman N. Bundesen. Chicago: Reilly & Lee, 1934. 158 pp. Price, \$1.50.

MEDICAL TACTICS AND LOGISTICS. By Colonel Gustavus M. Blech and Colonel Charles Lynch. Springfield, Ill.: Thomas, 1934. 205 pp. Price, \$4.00.

ABORTION. By Dr. William J. Robinson. Hoboken: American Biological Society, 1934. 123 pp. Price, \$2.00.

SKIN DEEP. THE TRUTH ABOUT BEAUTY AIDS SAFE AND HARMFUL. By M. C. Phillips. New York: Vanguard, 1934. 254 pp. Price, \$2.00.

ENCYCLOPEDIA OF SEXUAL KNOWLEDGE. Norman Haire, Editor. New York: Coward McCann, 1934. 636 pp. Price, \$6.00.

TEXT-BOOK OF MEAT INSPECTION. (Ante-Mortem and Post-Mortem). By Robert V. Ostertag. Chicago: Alex. Eger, 1934. 744 pp. Price, \$10.00.

ASSOCIATION NEWS

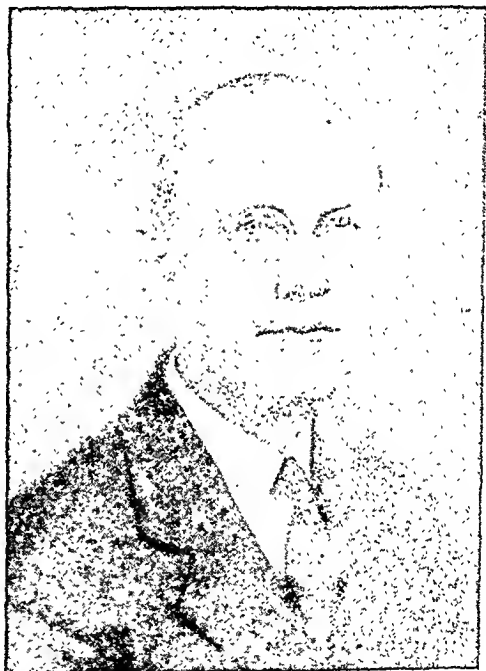
DR. REGINALD M. ATWATER APPOINTED EXECUTIVE SECRETARY

DR. EUGENE L. BISHOP, President of the American Public Health Association, announces the appointment of Reginald M. Atwater, M.D., Dr.P.H., as Executive Secretary of the Association. Dr. Atwater for the past 8 years has been Commissioner of Health in Cattaraugus County, N. Y., which was the first of the counties in New York State to organize on a full-time county unit basis for health.

Dr. Atwater, who is a native of Colorado, is a graduate of Colorado College and of the Harvard Medical School where he received his M.D. degree in 1918. He became a Rockefeller Foundation Fellow in Public Health and was granted the degree of Dr.P.H. by Johns Hopkins in 1921. Going to the Orient Dr. Atwater became Associate Professor of Hygiene in the Hunan-Yale College of Medicine in Changsha, China, from which post he returned to the United States in 1925 to teach in the Harvard School of Public Health.

Since 1927 Dr. Atwater has occupied his present position in Cattaraugus County where he has been in charge during the period of transition from the health demonstration to the official department of health. During his administration several active research projects have been carried out in Cattaraugus County through the coöperation of the Milbank Memorial Fund, the U. S. Public Health Service, and other agencies. Studies of tuberculosis pre-

vention and control, studies of rural water supplies, of rural health administration, and of general morbidity have been published from the Department.



Reginald M. Atwater, M.D., Dr.P.H.

The new Executive Secretary is a member of his county and the New York State Medical Societies, a Fellow of the American Medical Association, and a Fellow of the A.P.H.A. He is the author of several studies in epidemiology published in professional journals and he comes to the Association with a background of full academic training and practical experience in public health.

MISSING

GEORGE H. BIGELOW, M.D., F.A.P.H.A., formerly Commissioner of Public Health of the Commonwealth of Massachusetts, and present Director of the Massachusetts General Hospital, Boston, Mass., is missing. He may be a victim of amnesia.

Members of the Association desire that the Journal publish the following description of Dr. Bigelow.

Description: 6 ft. tall; weighs approximately 175 lbs.; has deep blue eyes; heavy shock of black hair closely cut, slightly gray at the temples. He is of rangy build. When he left his home he wore a soft brown felt hat, a black overcoat with a velvet collar, a brown suit, and tan rubber-soled shoes, and a soft white shirt. He is 44 yrs. of age. He wore a square silver wrist watch with a leather strap, and carried a brown pigskin brief case.

He disappeared December 3, 1934, having left his home in Milton, Mass., for his office in the Moseley Building at the Massachusetts General Hospital, Boston, Mass. He was to appear at 8 P.M., Tuesday night, December 4, 1934, at the Staten Island Hospital to speak, and on Wednesday at the American Society for the Control of Cancer in New York City.

The finger prints of Dr. George H. Bigelow are in the possession of the Department of

Public Safety of the Commonwealth of Massachusetts. Hospitals are requested to finger print all amnesia victims unidentified,



George H. Bigelow, M.D.

forwarding the same to Colonel Paul G. Kirk, Commissioner of Public Safety, State House, Boston, Mass.

HEALTH CONSERVATION CONTESTS FREE SURVEYS

THE American Public Health Association, in coöperation with the Chamber of Commerce of the United States, has recently announced the offer of two free public health surveys, one to a city in connection with the City Health Conservation Contest and the other to a county or district in connection with the Rural Health Conservation Contest:

The survey will consist of a careful analysis of the city's or district's public health program, its facilities and the extent to which these facilities are meeting local public health needs, and will

include a report of the appraisal thus made together with recommendations for such readjustments or changes as would seem most likely to bring about a more effective program.

The survey will be made by the field staff of the Association. Any city entered in the City Contest or any district entered in the Rural Contest (except those receiving First Award) is eligible to apply for the free survey.

If a city or district desires to be considered, the approval of the health officer should first be secured by the Public Health Committee of the local Chamber of Commerce. A formal request should then be submitted to the

Insurance Department of the Chamber of Commerce of the United States or to the American Public Health Association. Such a request may precede or accompany the fact-finding schedule. However, for cities, this application must be submitted not later than March 1, and for counties not later than March 15. At least three cogent reasons stating why the public health committee feels its city or district would benefit by such a survey *must* accompany the request.

These two free surveys will be

granted not upon the scores obtained in the 1934 competitions but upon the following main factors:

1. The need of the community for a health survey
2. The opportunity and likelihood of the community making effective use of such a survey

For further information write either the Insurance Department, Chamber of Commerce of the United States, Washington, D. C., or the Committee on Administrative Practice, American Public Health Association, New York, N. Y.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

- Laura A. Arney, 2650 N. 74 Court, Elmwood Park, Ill., Health Officer
 Frank M. Carroll, M.D., 300 Public Safety Bldg., Seattle, Wash., Commissioner of Health
 W. H. Cleveland, M.D., Tupelo, Miss., Director, Lee County Health Department
 Leslie A. Lambert, M.D., C.P.H., Court House, Flint, Mich., Genesee County Commissioner of Health
 Marion F. Loew, 32 Kenmore Place, Brooklyn, N. Y., Acting Supervisor, Tuberculosis Clinics, New York City Dept. of Health
 Harley J. Powell, M.D., Court House, Bowling Green, Ohio, Wood County Health Commissioner
 Stephen G. Wilson, M.D., Health Dept., Clinton, N. C., Health Officer

Laboratory Section

- Robert S. Cosgrove, Coöperative Clinical Laboratory, Indio, Calif., Laboratory Technician
 Wallace B. McClure, M.D., D.P.H., 28 Maryland Blvd., Toronto, Ont., Canada, Bacteriologist, Provincial Dept. of Health

Public Health Engineering Section

- Lorenz E. Ordeltcheide, B.S., Sikeston, Mo., Assistant State Director, Malaria Control, U. S. Public Health Service.
 Prof. Harry G. Payrow, B.S., Lehigh University, Bethlehem, Pa., Assistant Professor of Sanitary Engineering

Industrial Hygiene Section

- Henry F. Smyth, Jr., Ph.D., Laboratory of Hygiene, Univ. of Penna., Philadelphia, Pa., Instructor in Sanitary Chemistry

Food and Nutrition Section

- Helen S. Mitchell, Ph.D., Massachusetts State College, Amherst, Mass., Research Professor of Nutrition, Home Economics Division
 Carl S. Pederson, Ph.D., New York Agricultural Experimental Station, Geneva, N. Y., Chief in Research and Bacteriology
 Christian P. Segard, M.D., 2740 Graybar Bldg., New York, N. Y., Wisconsin Alumni Research Foundation

Child Hygiene Section

- James T. Kenney, D.D.S., State Board of Health, Jefferson City, Mo., Supervisor of Public Health Dentistry.

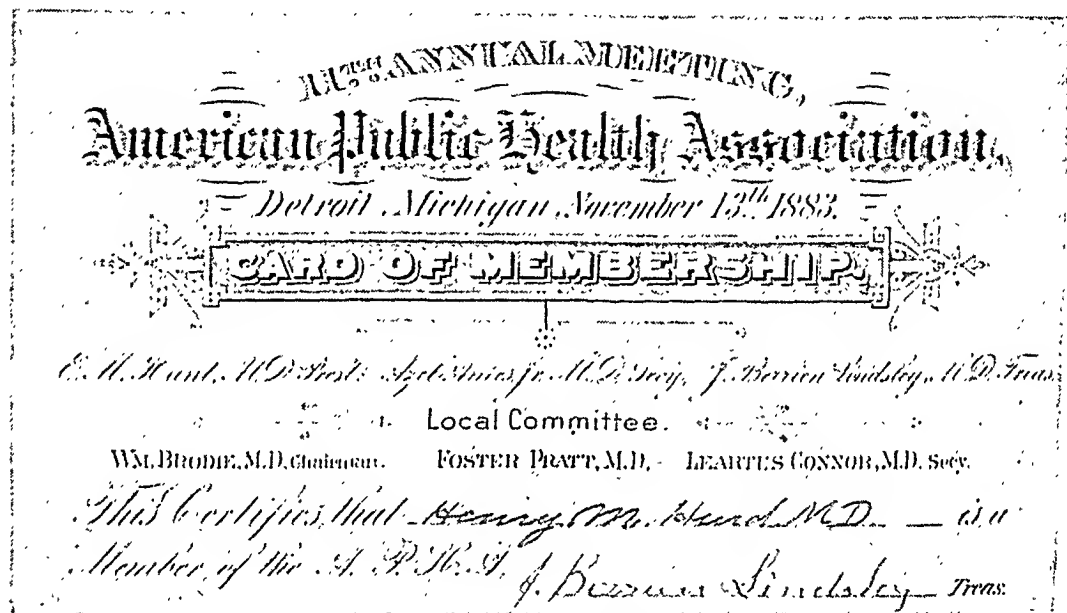
Public Health Education Section

- Gretta M. Adams, M.S., 615 Belle Ave., San Rafael, Calif., Professor of Hygiene, Dominican College
 Ramona Borree, 532 Fourth St., Haywood, Calif., Public Health and School Nursing, Alameda County Health Dept.
 Mary C. Bushard, 422 Main St., Hayward, Calif., Teacher of Home Hygiene and Public Health
 Eloise A. Hafford, 735 N. Los Robles, Pasadena, Calif., Director, Health Education, Ruth Home, El Monte, Calif.
 Walter O. Kraeft, M.S., 1107 Monroe Ave.,

A. Elizabeth Bigelow, 577 E. Main St.,

Neva R. Hackworth, R.N., Perryville, Ark.,
School Nurse

Henry Packer, M.D., 356 Oak St., New Haven,
Conn., Candidate for Dr.P.H., at Yale Univ.



John E. Ransom, Assistant Director of The Johns Hopkins Hospital, Baltimore, Md., very kindly sent to the Association an old membership card dated November 13, 1883. For the interest of the members, we are reproducing it above.

NEWS FROM THE FIELD

HEALTH EDUCATION SCHOLARSHIP AVAILABLE

A FULL tuition scholarship of \$500 is available in the field of health education at the Massachusetts Institute of Technology (Department of Biology and Public Health), Cambridge, Mass., for 1935-36. This scholarship covers the full scholastic year, beginning in September and closing in June. It is available for women only.

This scholarship will be awarded to a candidate recommended by the National Tuberculosis Association. Applicants should have basic training in mathematics, physics, chemistry, and biology. Undergraduate training in psychology and education is desirable. The awards will be based upon the nature and quality of the previous academic work of the applicant, personality qualifications for professional work in the field of public health, and need of scholarship aid. Preference will be given to candidates possessing the Bachelor's degree and having had successful teaching or administrative experience.

DU PONT OPENS NEW RESEARCH LABORATORY

E. I. DU PONT de Nemours & Company dedicated and opened on January 22 its new medical research laboratory, to be known as the Haskell Laboratory of Industrial Toxicology, the purpose of which will be to test thoroughly, from a health standpoint, all products produced by the Company before they are placed on the market.

The laboratory was planned to meet a need which has developed in this country because of the great growth of

the chemical industry as represented by du Pont. Many new products have been developed in recent years and other new products are constantly being developed, some of them through entirely new processes. A function of the laboratory will also be to study the possible effects of the new products upon the health of employees during the process of manufacture.

NEW OFFICERS ELECTED AT GENEVA MEETING

AT the meeting of the International Congress on Public Health Works held recently in Geneva, the following officers were elected:

President, M. Justin Godart

Vice-Presidents, H. E. G. DeMichelis, Sir George Buchanan, C.B., M.D., and H. E. Alfredo de Castro.

Secretary General, M. Raymond Mage.

MENTAL CLINIC FOR CHILDREN

THROUGH an endowment from the Friedsam Foundation, a new Division of Child Neurology has been created by the Neurological Institute of New York.

Dr. Bernard Sachs will be the Director of the new division, and Dr. Frederick Tilney, Director of Research of the Institute, will be Associate Director and in charge of research work. Dr. Louis Casamajor will serve as an Associate Director.

AMERICAN STUDENT HEALTH ASSOCIATION ELECTS NEW OFFICERS

AT the last annual meeting in New York City, Dr. R. W. Bradshaw, College Physician, of Oberlin College, was reelected President of the American

Student Health Association. Dr. Wade McMillan, of Miami University, was elected Vice-President, and Dr. Harold S. Diehl, member A.P.H.A., of the University of Minnesota, was elected Secretary-Treasurer.

DEATHS

HARRY F. FERGUSON, member A.P.H.A., Chief Engineer, Division of Sanitary Engineering, State Department of Public Health, Springfield, Ill., died January 16.

DR. LEWIS STEPHEN PILCHER, Editor for half a century of the *Annals of Surgery*, died December 24, 1934, at the age of 89.

PERSONALS

DR. WALTER HENRY HARTUNG, of Toledo, was appointed Director of Health of Ohio on November 28 by Governor-Elect Martin L. Davey. He is a member of the staff of St. Vincent's Hospital, Toledo.

DWIGHT S. ANDERSON, member A.P.H.A., of Woodside, N. Y., has been announced as the new Director of the Public Relations Bureau of the Medical Society of the State of New York, with offices at 2 East 103rd Street, New York.

DAVID H. MCALPINE was reelected President of the United Hospital Fund at the annual meeting of the corporation held in New York recently.

MAURICE BRODIE, M.D., member A.P.H.A., of New York, and WILLIAM H. PARK, M.D., F.A.P.H.A., of New York, were named among others as having made great contributions to medical science during 1934, as announced in *Modern Medicine*. Dr. Brodie was honored especially for his work in developing a vaccine for infantile paralysis; and Dr. Park for his development of an infantile paralysis vaccine and for his work in preventive medicine.

CONFERENCES

Mar. 27-29, Canadian Section, American Water Works Association, London, Ont., Canada.

March 31-April 7, National Negro Health Week—21st Annual Observance.

April 10-11, Montana Section of American Water Works Association, Helena, Mont.

April 11-12, Four States Section Meeting of American Water Works Association, Atlantic City, N. J.

April 24-27, National Convention, American Physical Education and its Eastern District Society, Pittsburgh, Pa.

April 29-May 3, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.

May 6-10, Annual Convention of American Water Works Association, Cincinnati, Ohio.

May 24-25, Spring Meeting of New York State Sewage Works Association, Poughkeepsie, N. Y.

June 4-9, Annual Meeting, Royal Institute of Health, Harrogate, England.

June 17-19, Ninth Annual Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.

June 19-22, Eighth Health Education Conference of the American Child Health Association, Iowa City, Iowa.

June 24-29, Summer Meeting of the American Association for the Advancement of Science and Associated Societies, Minneapolis, Minn.

July 15-20, Royal Sanitary Institute Health Congress, Bournemouth, England.

July 22-27, Seventh International Congress on Industrial Accidents and Diseases, Brussels, Belgium.

July 23-27, International Congress on Life Assurance Medicine, London.

Aug. 10-17, Meeting of Health Section of the World Federation of Education Associations, Oxford, England.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

March, 1935

Number 3

Relation of the Retail Price of Milk to Production Costs^{*}

THOMAS PARRAN, JR., M.D., F.A.P.H.A.

State Health Commissioner, Albany, N. Y.

THE watersheds of our rivers have played an important part in the development of this country; but it is the milkshed of the vast stream discharging some 3 million quarts a day into the milk bottles of Greater New York which has caused a new landmark to be set up in the political economy of the state, and which has become one of the proving grounds for the joint problems of agricultural relief and industrial control. Milk has become a public utility in the sense that 7 states—and where the states have not acted, the federal government—have assumed responsibility of guaranteeing to the producers of milk a fair return, and of protecting the consumer against unfair cost. Health officials are not primarily interested in the price of milk; yet when cutthroat competition demoralizes the industry, or when low prices to producers threaten bankruptcy, or when exorbitant prices curtail the buying power of the masses, or when a milk strike shuts off a city's supply, the health officer has a

very immediate concern. In other words, in so far as the economic aspects of the milk industry have an impact upon a continuous supply of standard quality, the public health considerations loom large.

For these reasons the Legislature of New York State made the Health Commissioner an *ex-officio* member of a milk control board established in 1933. This board was given absolute authority to regulate and control every phase of the dairy industry in New York except sanitary control. The constitutionality of the law was upheld by the United States Supreme Court.

On the whole, our experience with state regulation has shown that it is of value to the producer. Dealers have operated with a narrower spread between the buying and the selling price. The farmer receives a larger percentage of the consumer's milk dollar than under previous unregulated competitive conditions. During the past 12 months New York State farmers received 23 million dollars more for their milk than in 1931 although the selling price in New York City averaged slightly over 2 cents per quart less than in 1931.

^{*} Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

TABLE I

ESTIMATED COST OF PRODUCING MILK IN 1932
(Based on Warren-Misner Formula)

Item	
Grain, 30 lb. @ \$23.99 per ton ¹	\$0.36
Silage, 100 lb. @ \$6.00 per ton ².....	.30
Hay, 60 lb. @ \$7.08 per ton ³.....	.21
Labor, 2.5 hours @ \$.20 per hour....	.50
Total feed and labor (80%).....	\$1.37
Other costs (20%) ⁴.....	.34
Total yearly cost (100%).....	\$1.71
Average net price to farmers ⁵	1.26
Loss	\$0.45
Net return per hour of labor ⁶	\$0.02

Public dissatisfaction with the price of milk in relation to what the farmer gets is a perennial topic in most cities. Few consumers understand, for example, why the farmer in New York State in July, 1934, received an average price of \$1.61 per cwt. (3.5 cents per quart) while the consumer in New York City pays 13 cents for Grade B milk and 16 cents for Grade A milk delivered at the doorstep. I shall not undertake to prove that this "spread" is justified. I shall attempt, however, to give you a statistical picture of the elements in this spread.

Let us first consider production costs. Professor Warren of Cornell University, from investigations covering 9 dairy states, has devised a formula for determining these costs. Tests in other milksheds show the formula to be accurate within 4 per cent. It is based on the fact that it requires 190 lb. of various types of feed and 2½ hours' labor to produce 100 lb. of milk. These two elements constitute 80 per cent of milk production costs. In Table I this formula is applied to feed costs in New York for the year 1932 at a 20 cents per hour labor rate. For the first 6 months of 1934 the monthly average of milk prices per cwt. was \$1.61 as compared to a production cost of \$2.16.

1. Grain is charged at \$4.00 per ton above the wholesale price for a dairy ration at Utica, N. Y., as reported in *Farm Economics*, New York State College of Agriculture.

2. Silage is charged at the approximate cost of growing and harvesting as shown by cost accounts on New York farms.

3. Hay is charged at the prevailing price on the farm, as reported in *Farm Economics*.

4. Miscellaneous costs, other than feed and labor, have been found to constitute about 20 per cent of the total cost of producing milk. In these computations, these miscellaneous costs are estimated at 25 per cent of the feed and labor costs, with labor charged at \$.20 per hour.

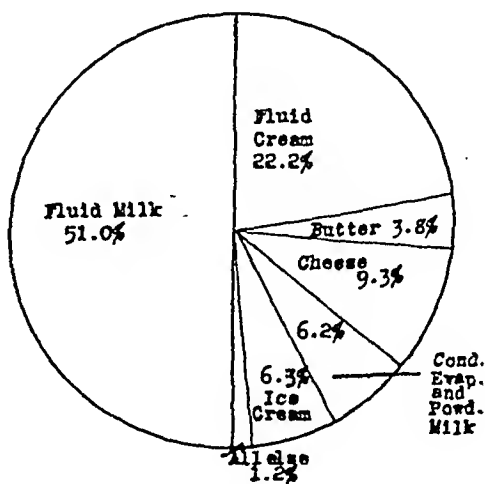
5. Average of the Dairymen's League net pool price and the Sheffield price, 201-210 mile freight zone, for milk testing 3.6 per cent fat.

6. The average net price for milk less all charges except for labor, divided by 2.5, the approximate hours of labor per 100 lb. of milk.

One apparent reason for the difference between the price received by the farmer and the retail price is that in New York State only about one-half of all milk produced is sold as fluid milk. Figure I shows the utilization of milk for 1931. The milk which cannot be sold as fluid milk brings a somewhat lower price as fluid cream and succes-

FIGURE I

UTILIZATION OF MILK RECEIVED AT DAIRY PLANTS IN NEW YORK STATE, 1931



Only about half the total supply for the year is used as fluid milk and less than three-fourths as fluid milk and cream. The remainder is converted into manufactured products. There are wide seasonal differences in utilization.

sively lower prices for ice cream, evaporated milk, cheese and butter. In other words, the surplus which must be sold at cheaper rates lowers the average price.

One is inclined to say, "Eliminate the surplus by reduced production or increased consumption." Unfortunately, because of the nature of the milk business a surplus of at least 25 per cent over average fluid requirements is necessary to meet unpredictable variations between supply and demand. While the farmer in New York was receiving \$1.61 per cwt. during the first half of 1934 the price he received for milk consumed as fluid milk was \$2.40, while that paid for milk which went into butter and cheese averaged less than \$1.00.

These prices which I quote are at the country milk plant, 200 miles from New York City. More or less actually is paid depending upon whether the milk is closer to or further from New York City.

The elements which enter into the dealer's spread are summarized for 19 New York City dealers for August,

1933, for fluid milk and fluid cream (see Table II). At that time the retail price of home-delivered milk was 12 cents and 15 cents, yet attention is called to the fact that the average sale by the dealer, wholesale and retail, amounted to only \$.086. Prices of milk at stores were 1 and 2 cents less than the home-delivered price. The actual utilization of milk by classes is shown in a later table.

Attention is called also to the great variation in the efficiency of operation of these 19 dealers. Only 5 of them made a profit for that month. One or two of the largest made relatively large profits, while a considerable percentage were losing money. This factor introduces a most baffling problem in attempting to fix milk prices to producers and to consumers. Obviously the state cannot guarantee a profit to the least efficient element in the industry. Should prices be set which will drive out of business one-quarter, one-half, or nearly all of the milk dealers? To do this would tend to create a monopoly, and with the present uncertainty as to the nature and extent of permanent state

TABLE II

SUMMARY OF SALES, COSTS AND PROFITS, 19 NEW YORK CITY DEALERS, AUGUST, 1933

Item	Amount per Quart			Per Cent of Sales
	Average	High	Low	
Sales	\$.08651	\$.10254	\$.05222	100.00
Product Cost . . . . .	.04440	.06230	.03126	51.33
Gross Spread . . . . .	.04211	.04894	.00894	48.67
Operating Costs				
Country Plants . . . . .	.00469	.00931	.00000	5.42
Transportation . . . . .	.00620	.00798	.00000	6.96
City Pasteurizing Plants . . . . .	.00428	.00600	.00000	4.95
Containers . . . . .	.00178	.00318	.00054	2.06
Delivery and Selling . . . . .	.02344	.03464	.00259	27.09
General and Administrative . . . . .	.00186	.00403	.00081	2.15
Total Operating Costs	\$.04207	\$.05827	\$.01448	48.63
Net Operating Profit . . . . .	.00004	.00371	-.01218	0.04
Net Other Expense	-.00004	.00048	-.00427	-0.05
Net Profit before Taxes . . . . .	.00008	.00330	-.01266	0.09
Federal Income Tax . . . . .	.00001	.00040	.....	0.01
Net Profit after Taxes . . . . .	.00007	.00290	-.01266	0.08

TABLE III

DISTRIBUTORS' MARGINS ON RETAIL MILK, STANDARD GRADE *

Year	Hartford	Boston	New York	Phila- delphia	Balti- more	Wash- ington	Mil- waukee	Pitts- burgh	Minne- apolis
(Cents per quart)									
1921.....	6.4	6.9	...	5.2	5.8	...	...	7.2	5.3
1922.....	6.4	6.2	6.8	5.2	5.5	...	...	5.8	4.9
1923.....	6.5	6.0	6.7	5.3	5.3	...	...	6.0	5.1
1924.....	6.5	6.0	6.6	5.0	5.3	6.5	4.8	6.1	5.5
1925.....	6.5	6.0	6.7	5.0	5.1	6.4	4.6	6.0	5.4
1926.....	6.6	6.0	6.8	5.1	5.4	6.5	4.7	6.1	5.4
1927.....	6.5	6.2	6.9	5.3	5.7	6.7	4.6	6.3	5.2
1928.....	6.5	6.5	6.9	5.3	5.7	6.6	4.5	6.2	5.8
1929.....	6.6	6.5	7.0	5.4	5.7	6.2	4.7	6.3	5.9
1930.....	6.5	6.6	6.9	5.3	5.8	6.2	4.9	6.2	5.7
1931.....	6.5	6.6	6.9	5.1	5.4	6.1	4.5	5.9	5.7
Av. 1921-31...	6.5	6.3	...	5.2	5.5	...	...	6.2	5.4
Av. 1926-30...	6.5	6.4	6.9	5.3	5.7	6.4	4.7	6.2	5.6

* These margins were computed as follows: The quoted Class I or Basic Prices were adjusted to a uniform basis. The quoted prices for each market were adjusted so as to apply to milk of the average fat content sold in each city. The margins given are the result of subtracting the adjusted Class I or Basic Prices from the quoted retail prices for each market as reported by the U. S. Department of Agriculture. From these margins must come the cost of city processing and distribution, and the distributors' profits.

and federal control this seems contrary to the public interest. In other words, unless rigorous control is to be exercised permanently, or unless cities themselves are to operate milk distribution systems or give limited franchises to one or two companies, it does not seem reasonable to destroy a large number of distributors even though admittedly there are too many for efficient operation. There is an even more practical consideration. When faced with losses milk dealers, in spite of rigorous laws, will seek to evade the required payments to farmers; or, if a dealer does go into bankruptcy, a large group of farmers stand to lose several months' milk payments and often are left with no market outlet.

The problem of the dealer's spread becomes somewhat simplified when we consider the actual operating costs for a typical month, as shown in Table II. How justifiable each of these costs may be furnishes ground for debate. Let us consider two items. There are too many distributors for efficient operation; there are also too many country plants.

Country plant costs approximate $\frac{1}{2}$ cent per quart. One-half the number would operate as efficiently, but in a highly competitive business how can the state compel combinations of plants short of actual ownership?

Delivery and selling costs amount to nearly $2\frac{1}{2}$ cents per quart. If home deliveries alone were considered this cost would be nearly doubled. It is obvious that unified selling and delivery in place of the present multiplicity of plants, trucks and wagons would reduce these costs materially if equal efficiency of operation could be assumed. It would be of interest if some city in the country were to experiment with municipal operation of the milk distribution system. Bearing in mind natural variations in costs between different cities because of obvious factors, some yardstick as to relative performance would be had. In connection with variations in costs between different cities, data collected by a legislative commission in New York will be of interest and are shown in Table III. These margins were adjusted to make

the comparison as accurate as possible.* Natural variations in spread depend upon many local factors which cannot be discussed in the limits of this paper.

cent although at present the decline has halted and seems to be started on an upward trend again. This reduced consumption, coupled with a slightly in-

TABLE IV
ANALYSIS OF GROSS SPREAD
19 NEW YORK CITY DEALERS, AUGUST, 1933

<i>Item Sold</i>	<i>Per Cent of Total Milk Equivalent</i>	<i>Average Selling Price</i>	<i>Average Cost</i>	<i>Average Gross Spread.</i>	<i>Per Cent of Total Spread</i>
Grade B Milk					
Retail, Bottled	19.9	\$.1210	\$.0521	\$.0689	32.6
Wholesale, Bottled	19.1	.0981	.0527	.0454	20.7
Wholesale, Bulk	4.9	.0823	.0485	.0338	3.9
Other Dealers	5.7	.0681	.0527	.0154	2.1
Total	49.6	.1023	.0520	.0502	59.3
Grade A Milk *					
Retail, Bottled	10.0	.1542	.0677	.0865	20.6
Wholesale, Bottled and Bulk	1.7	.1327	.0673	.0654	2.6
Other Dealers	0.4	.0850	.0677	.0173	0.2
Total	12.1	.1489	.0676	.0812	23.4
Cream					
Retail, Bottled	4.8	.0707	.0318	.0389	4.5
Wholesale, Bottled	9.4	.0522	.0324	.0198	4.4
Wholesale, Bulk	5.3	.0436	.0337	.0099	1.2
Other Dealers	2.2	.0410	.0340	.0070	0.4
Total	21.7	.0531	.0328	.0203	10.5
Other Products	16.6	.0374	.0200	.0174	6.8
All Products	100.0	\$.0865	\$.0444	\$.0421	100.0

* Includes small amount of certified and other special milk.

In Table IV the gross spread of 19 New York State dealers for August, 1933, is analyzed. From this it is seen that, from the total volume of milk equivalent, 50 per cent was sold as Grade B fluid milk, 12 per cent as Grade A, 22 per cent as cream, and 16 per cent in various by-products.

In recent years a new factor has entered into the costs of most kinds of business. This is the lack of capacity operation. Milk consumption in New York City has dropped about 15 per

cent although at present the decline has halted and seems to be started on an upward trend again. This reduced consumption, coupled with a slightly in-

creased production of milk, is the primary factor which brought about the collapse in milk prices and the resultant state control. Because present consumption of milk throughout the state is considerably less than is needed for normal human nutrition, to meet this problem New York has pioneered in state action to increase consumption through advertising. The cost is borne jointly by producer and dealer. If this venture is attended with the same success as experienced in advertising other food commodities, both public and industrial health will be promoted thereby.

* For full discussion see Report of the Joint Legislative Committee to Investigate Milk Industry, page 187.

The milk industry, like others, has been criticised for over-capitalization, for seeking to pay dividends on "watered stock," and similar practices common to American business generally.

The data I have given above do not relate to return on capital but solely to operating costs. In 1931, 28 of the larger distributors in New York City valued good will at 7.4 per cent of total assets. The valuations of lands, buildings, and equipment probably represented the previous higher level of prices. Studies made by the New York Milk Control Board in August, 1933, sought to eliminate from reported costs and capital investment every unnecessary or "padded" item. These adjustments in cost and net worth included holding company charges, excessive salaries of officers, idle property, good will, and increase in value of fixed assets. This reduction both in reported costs and investment increases the apparent rate of return on the dealer's net worth from $1/8$ per cent to $3\frac{1}{3}$ per cent per year. However, this maximum apparent saving in costs would amount only to $1/10$ cent per quart of milk. In other words, excessive salaries and over-capitalization in themselves do not contribute materially to the price of a quart of milk. If substantial reductions in the costs of milk to the public are to be made, they must be accomplished through more efficient operations or the elimination of costly services.

This is a brief sketch of milk costs and control measures up to date. What of the future? What are the objectives? In my opinion state control

must provide the consuming public with an adequate and continuous supply of safe and wholesome milk at a price which represents a just return and no more to producers and distributors for their labor and investment. Costs cannot be guaranteed either to the inefficient producer or distributor. Milk has become a public utility in effect if not in name in New York and in many other milksheds of the country. In other public utilities we have seen some measure of public ownership and operation following earlier attempts at regulation. Shall we see a similar venture in the milk industry? Some thoughtful students of the problem see no way of reducing materially the present spread between the retail price of milk and the price received by the farmer unless major reforms are made in the industry, or unless the state or municipalities undertake public operation. The necessary major reforms to increase efficiency are scarcely possible unless in each milkshed a practical monopoly is exercised either by farmers' coöperatives, by the distributing companies, or by both.

If there should be a real shortage of milk as prophesied in bulletins following the recent drought, competitive conditions of previous years again may prevail. So long as production continues greatly in excess of fluid consumption, public regulation of prices to farmers probably will be continued. If production costs increase and consumer resistance to higher prices tends to reduce consumption, there may be public demand for major reforms in milk distribution or municipal operation.

The Cause of Breast Cancer*

EMIL BOGEN, M.D.

Olive View Sanatorium, Olive View, Calif.

THE prominent location, characteristic clinical course and high fatality rate of cancer of the breast make its official mortality returns a particularly reliable index to its actual occurrence.¹ Examination of the data for different times and places reveals variations in its incidence deserving analysis and interpretation that may well be withheld from forms of cancer offering greater difficulty in recognition.²

The number of deaths from cancer of the breast in any particular time and place tells us little regarding its relative importance unless this is expressed in terms of the number of persons exposed to such a possibility. The rate for the entire population is usually the most readily ascertainable figure. This may be, however, quite misleading, if variations in the composition of the population affecting this rate are not recognized.³

Since nearly 99 per cent of all cancers of the breast occur in women,⁴ the rate for the entire population may be expected to be low in regions where males predominate, as in Nevada with 14 males to each 10 females, and high in places where there is an excess of females, as the District of Columbia with only 9 males to each 10 females.⁵ This source of error is eliminated in tables in which the deaths are expressed in terms of the number of females liv-

ing, but for most large populations it is of little importance.

The age distribution of the population constitutes a much greater source of variations and misconceptions. Cancer of the breast, as most other forms of cancer, is almost unknown in childhood and youth, and extremely rare in young adults, but its incidence increases rapidly during middle life and continues to rise up to extreme old age. The greatly higher death rate from breast cancer in older people is shown in practically all statistics that have been examined (Table I).

TABLE I
AGE AND BREAST CANCER,
U. S. REGISTRATION STATES, 1930

Age (Years)	Population	Deaths, Breast Cancer	Rate per 100,000 Population	Per Cent of All Cancers
0-4..	10,833,222	2	0.02	0.02
5-14..	23,347,523	3	0.01	0.03
15-24..	21,235,387	21	0.10	0.20
25-34..	18,017,199	290	1.61	2.68
35-44..	16,451,562	1,441	8.76	13.32
45-54..	12,487,707	2,671	21.42	24.68
55-64..	8,086,614	2,935	36.30	27.10
65-74..	4,559,756	2,107	46.20	19.44
75-....	1,841,550	1,354	73.60	12.53
Total ..	116,950,331	10,831	9.27	100.00

The actual number of deaths from breast cancer at the different ages, accordingly, varies with the age composition of the population concerned. Not only will there be a lower incidence of breast cancer in places with relatively few old people than in places where there are more aged inhabitants, but the age at which the majority of

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

the cancers actually appear will be correspondingly lower. Thus, in New Mexico, where less than 18 per cent of the population is over 45 years of age, only 61 per cent of the deaths from breast cancer occur after this age; while in New Hampshire, where more than 30 per cent of the population is over 45 years of age, more than 87 per cent of the breast cancer deaths occur in this age group.

A similar change in the age distribution of the persons dying with breast cancer as a result of the aging of the entire population may be seen in the returns for the U. S. Registration States of 1910 during the past two decades (Table II).

TABLE II

BREAST CANCER DEATHS IN THE U. S. REGISTRATION STATES OF 1910

Population	1911	1920	1930
Breast Cancer....	3,610	4,900	7,409
Rate All Ages*..	7.5	8.8	11.2
Rate Age 15-44..	2.9	3.1	3.6
Rate Age 45-64..	22.1	25.6	34.0
Rate Age 65-....	49.8	55.0	61.6
% Population over 45	20.9	24.0	25.6
% Breast Cancer over 45.....	80.6	82.7	84.4

* All rates, per 100,000 aggregate population.

Most, but not all of the increase in the proportion of breast cancer deaths occurring above 45 years of age in recent years may be ascribed to this change in the age distribution of the entire population. A small but significant lowering of the mortality rates

TABLE III
BREAST CANCER DEATH RATES PER 100,000 WHITE FEMALES, 1911-1930
METROPOLITAN LIFE INSURANCE COMPANY
INDUSTRIAL DEPARTMENT *

Age Period (Standardized)	Average Annual Death Rate	Mean Annual Change	Standard Error
25-44.....	8.8	-0.09	± 0.031
45-74.....	50.9	+0.42	± 0.109
1-74.....	12.3	+0.05	± 0.021

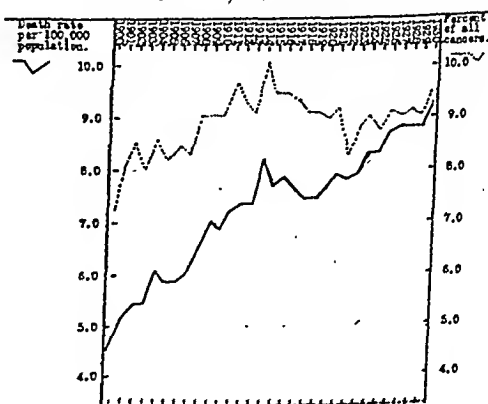
* Courtesy of Dr. Louis I. Dublin.

from this cause at the younger ages, however, and a definite increase in the older age groups, may be seen (Table III). The prolongation of life through palliative surgical and radiation therapy, even in incurable cancer of the breast, may be, at least in part, responsible for this change.⁶ This is supported by the fact that the average age of breast cancer cases reported in hospital statistics and in surgical reports is distinctly lower than that found in mortality reports.⁷

The crude mortality rate from breast cancer in the U. S. Registration Areas, as in most other countries, has been steadily rising during the past 30 years. By far the greater part of this change is obviously due to the change in the age distribution of the population. Even in the standardized or the age specific rates, however, an upward trend may be observed (Table II).

With the improvement in diagnostic methods, and the wider use of medical services, more cancers of inaccessible sites are being recognized, with consequent increase in the total number of cancer deaths reported.⁸ Accessible tumors such as those of the breast may be expected to share but little in this increased recognition. Accordingly, the fact that there has been no decrease in the proportion of breast cancers to the

FIGURE I—BREAST CANCER IN THE UNITED STATES, 1900-1930



total number of cancers also indicates that there has been an increase in the real prevalence of this condition (Table IV and Figure I).

TABLE IV

BREAST CANCER IN THE UNITED STATES, 1900 TO 1930

Year	Death Rate per 100,000 Population	Percentage of All Cancers
1900.....	4.5	7.3
1901.....	5.2	8.0
1902.....	5.4	8.5
1903.....	5.4	8.0
1904.....	6.1	8.6
1905.....	5.8	8.2
1906.....	5.8	8.4
1907.....	6.0	8.3
1908.....	6.5	9.1
1909.....	7.0	9.1
1910.....	6.9	9.1
1911.....	7.2	9.7
1912.....	7.3	9.4
1913.....	7.3	9.2
1914.....	8.2	10.1
1915.....	7.7	9.5
1916.....	7.8	9.5
1917.....	7.6	9.4
1918.....	7.4	9.2
1919.....	7.4	9.2
1920.....	7.6	9.1
1921.....	7.9	9.3
1922.....	7.8	8.3
1923.....	7.9	8.9
1924.....	8.3	9.1
1925.....	8.3	8.8
1926.....	8.7	9.2
1927.....	8.8	9.1
1928.....	8.8	9.2
1929.....	8.8	9.1
1930.....	9.2	9.5

Since these mortality figures do not include the increasing numbers of persons who have been successfully operated upon for cancer of the breast in recent years,⁹ there seems little doubt that the actual incidence of breast cancer is increasing, at least in this country and Great Britain.

The frequency of breast cancer in different countries varies widely.¹⁰ The data need to be adjusted for the large variations in the age distribution in different countries, but this does not suffice to remove the marked discrepancies noted. Deficiencies in the completeness of death registration and in the accuracy of diagnosis in different countries, it would seem, should lead to an apparent lowering of the absolute incidence of breast cancer, but to an

apparent increase in the proportion which it constitutes of all cancers. The close parallelism between these two types of data, however, indicates that the differences observed between countries is not generally due to variations in the age and sex distribution, or in the adequacy of death registration (Table V).

The rarity of all cancers in primitive peoples has been seriously questioned,¹¹ but as to its relatively infrequent localization in the female breast there appears little doubt. Available information from Japan and India, and from Chile and Uruguay, reveals breast cancer in these countries extremely seldom as compared to the European countries, while the English speaking countries report much higher figures.¹²

Different states in the United States show similar differences, which may not be entirely explained away by variations in the age and sex distribution of the population, or by differences in the adequacy of registration and diagnosis, although these may play a part. Thus, in 1920 the breast cancers in Massachusetts, with an adjusted mortality rate of 11.2 per 100,000 population, constituted 11.3 per cent of all cancers in that state, while in Mississippi, with an adjusted mor-

TABLE V

BREAST CANCER IN DIFFERENT COUNTRIES, 1930

Country	Rate per 100,000 Females	Per Cent of All Cancers	Birth Rate per 1,000 Population	
			1930	1910
England and Wales	29.2	19.1	16.3	23.8
Scotland	23.4	15.0	19.5	26.1
Denmark, urban.....	22.6	17.3	18.7	25.6
New Zealand.....	22.4	20.0	18.8	26.0
Switzerland	21.2	11.0	17.2	23.9
Netherlands	19.3	13.8	23.1	28.2
United States.....	17.6	16.1	18.9	24.9
Australia	16.5	17.2	19.9	28.1
Ireland	16.0	16.0	20.2	22.6
Norway	14.5	7.4	24.5	25.3
Canada	11.5	17.6	24.5	26.6
Italy	6.0	10.0	26.2	31.7
Spain	3.6	7.0	29.0	31.2
Ceylon	3.6	7.6	39.0	38.1
Japan	1.8	3.0	32.4	34.1
Chile	1.2	2.0	39.8	37.0

tality rate of 3.4 per 100,000 they constituted only 6.8 per cent of all cancers.¹³

In general, breast cancer mortality rates have been higher in urban than in rural districts, in northern than in southern states, and in whites than in negroes. Although a large part of the

apparent differences in the crude rates disappears when they are adjusted for age distribution, the general relations remain, and the proportion of breast cancers to all cancers shows the same relations (Table VI).

It has been repeatedly noted in recent years that cancer of the breast is relatively much more frequent in single than in married women.¹⁴ It appears also to be true that among the married women cancer of the breast is more often encountered among the nullipara than among those who have borne children, and there are indications that it is even less frequent among those who have had a large number of children.¹⁵

These last observations may be readily harmonized with the foregoing mortality statistics, and go far to clarify the differences that are observed. If childbearing and lactation tends to prevent cancer of the breast, it may be readily expected that the incidence of cancer of the breast in recent years would rise in most places with a falling birth rate, and that the countries with higher birth rates, like Japan, or the southern and rural districts in the United States, or the negroes and other population groups having a higher birth rate, would still have a low incidence of cancer of the breast.

If the states are arranged in the order of their breast cancer mortality rates for the female population over the age of 45 only, thus avoiding discrepancies due to age and sex differences, there is found a very high inverse correlation with that obtained by taking them in the order of their birth rate for the female population between the ages 15 and 45. In other words, generally speaking, states with a high breast cancer rate have a low birth rate, and *vice versa*.

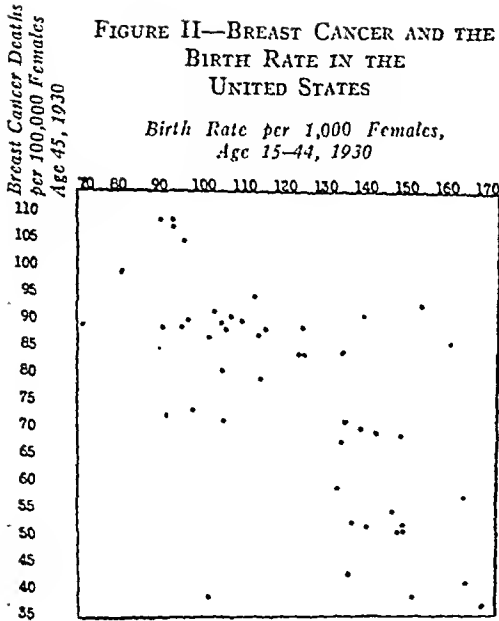
Logically, of course, we may expect that the birth rate of 30 years or so prior, when the women now developing

TABLE VI

BREAST CANCER AND THE BIRTH RATE IN THE UNITED STATES

State	Breast Cancer per 100,000 Females, Age 45+	Deaths per 100 of All Cancer	Births per 1,000 Females, Age 15-44	
	1930	1930	1930	1900
Massachusetts . . .	109.4	11.2	70	90
Rhode Island . . .	108.9	10.5	73	93
New York	107.3	10.5	66	93
Connecticut	103.5	10.7	71	96
California	99.4	10.5	62	82
Maryland	95.8	10.1	78	111
Idaho	92.5	11.0	95	155
New Jersey	91.4	10.0	68	102
Washington	90.4	9.5	63	106
Minnesota	89.9	8.4	79	139
Oregon	89.8	9.6	62	94
Missouri	89.5	9.1	71	110
Michigan	89.0	10.0	87	104
New Hampshire . .	88.6	9.3	81	90
District of Col. . .	88.4	9.1	63	70
Ohio	88.2	10.1	75	96
Montana	87.8	9.8	85	123
Illinois	87.7	10.1	67	105
Iowa	86.2	9.6	76	113
Kansas	83.9	7.8	78	115
Colorado	83.1	9.2	77	101
Utah	82.4	9.4	113	160
Wyoming	82.3	9.3	89	133
Nebraska	82.1	8.6	84	124
Wisconsin	82.0	8.2	84	123
Delaware	80.0	9.6	81	104
Pennsylvania . . .	79.2	8.9	83	112
Vermont	72.5	8.2	94	96
Maine	71.0	7.1	95	92
Indiana	70.6	8.5	80	105
Louisiana	70.2	9.0	81	134
Florida	69.1	10.0	73	138
Alabama	68.6	10.7	101	142
South Dakota . . .	67.2	8.3	80	150
Kentucky	66.3	9.3	101	133
Virginia	57.6	8.7	98	132
New Mexico	56.2	9.0	126	163
Georgia	54.3	8.8	84	147
Tennessee	53.1	8.7	83	134
Mississippi	52.7	8.3	99	139
West Virginia . . .	52.0	7.5	107	150
Arkansas	50.0	9.6	93	149
North Carolina . .	49.6	8.3	102	150
Arizona	42.4	5.6	102	133
Oklahoma	40.5	6.6	110	160
Nevada	37.5	4.1	75	100
South Carolina . .	36.5	7.0	94	152
North Dakota . . .	35.7	4.4	98	168

FIGURE II—BREAST CANCER AND THE
BIRTH RATE IN THE
UNITED STATES



cancer of the breast were in their child-bearing age, would better reflect the influences bearing on them than that today. Unfortunately, the U. S. Registration Area for Births is only 18 years old, and has only recently included all of the states. The census for 1900,¹⁶ however, included an attempt at an approximation of the birth rate in the various states at that time, and this may be taken, for want of better, for comparison. It may be seen that although the actual birth rate has decreased markedly in practically all parts of the country, the relative order of the different states shows little change not accounted for by differences in the age and sex composition of the people. Accordingly we find again that the states with the high breast cancer rate in 1930 generally showed a low birth rate in 1900, and the states with the high birth rate in 1900 are found to have a low breast cancer rate in 1930 (Table VI and Figure II).

Available data for the different countries of the world agree with this finding (Table V). Arranging the various countries in the order of increasing birth rate in 1900, or before the war,

gives almost the same list as that in the order of increasing mortality rate from cancer of the breast, or the ratio of breast cancer to total cancers. A superficial inquiry into the different countries involved also emphasizes the fact that cancer of the breast is more prevalent where early weaning of the infant is the rule, and is less often met with where breast feeding is common and prolonged.

Clinical investigation of large groups of women suffering from cancer of the breast confirms and amplifies these observations.¹⁷ Not only is cancer of the breast found with disproportionate frequency in single women and in nullipara, but it is also more prevalent among women who have had miscarriages or stillbirths or for some other reason, although pregnant, have failed to nurse their young. Particularly suggestive are the reports of cases where cancer has developed in an unused breast, and not in the contralateral lactating breast.

These are objective facts gleaned from an impersonal survey of official records and clinical data by a number of different workers, and confirmed by a series of case records personally examined for the present study. They indicate quite definitely that the retention of milk and other secretions in the breast due to non-lactation may be a potent factor in the production of many, if not all, cases of carcinoma of the mammary gland, and that the removal of such substances by suckling exerts a definite prophylactic effect against the development of such tumors.

Animal experimentation sheds further light on this phenomenon. White mice that have had their young removed at birth, so that they cannot suckle them, develop mammary carcinoma quite similar to the breast cancers in women. That this is due to local retention of secretions and not to a general endo-

crine disturbance is shown by the fact that white mice that have had their breasts occluded on one side only by ligature develop cancer on that side, and not on the other. These findings, first reported by Bagg nearly a decade ago,¹⁸ have been amply confirmed in our experience at Olive View (Table VII).

TABLE VII

EXPERIMENTAL INDUCTION OF MAMMARY CARCINOMA IN MICE

Olive View, Calif., 1932-1934

Procedure	Total Number of Mice	Average Number of Litters	Average Survival Period, Months	Number Developing Breast Cancer	Per Cent Developing Cancer
Young removed at birth.....	18	7	18	10	55
Nipples on left side ligated, suckling with right side	18	4	15	6	33
Normal breeding controls	18	5	18	0	0

Recent investigations into the carcinogenic actions of tars and related substances have shown that a reduced derivative of cholesterol is capable of producing cancer just as effectively as are some of the coal tar and other phenanthrene compounds.¹⁹ Cholesterol is present in the ducts of the non-lactating female breast of the virgin, as well as in the secretions of the lactating breast,²⁰ and in the absence of the normal drainage that comes with lactation, it may undergo the reductions that would lead to the development of carcinogenic properties. Childbirth and lactation constitute, accordingly, a natural protection against this endogenous carcinogenic agent.

SUMMARY

Analysis of available vital statistics shows that cancer of the breast is strikingly associated with a low birth rate. Clinical investigation confirms

this finding and indicates that it is more particularly related to lack of drainage of the mammary glands. Animal experimentation shows that this is due, not to endocrine derangement subsequent to the lack of suckling, but simply to the local retention of secretions in the non-lactating breast. Recent chemical investigations have revealed the existence of chemical substances in the normal breast secretions which may, after many years of retention, exert carcinogenic effects similar to those well known to result from the exogenous application of certain coal tars. The results of the clinical, biological and chemical investigations concur with those of the analysis of the vital statistics in emphasizing the etiological rôle of retained mammary secretions in the development of cancer of the breast.

BIBLIOGRAPHIC REFERENCES

1. Wood, H. B. *Am. J. Surg.*, Oct., 1932.
2. Greenwood, Major. *Studies on the Diagnosis and Nature of Cancer*. Wood, 1930.
3. Wilson, E. B. *Am. J. Cancer*, 16:1230 (Sept.), 1930.
4. *Mortality Statistics*, 1930, p. 236.
5. *World's Almanac*, 1934, p. 252.
6. Greenwood, Major, and Lane Clayton, J. E. *Proc. Roy. Soc. Med.*, 20:569 (Mar.), 1927.
7. Ewing, James. *Neoplastic Diseases* (3rd ed.), 1928, p. 546.
8. Bolduan, C., and Weiner, L. *Quart. Bull.*, New York Dept. of Health, 14, 9:5 (Sept.), 1932.
9. Report of the Cured Cancer Meeting. *New Eng. J. Med.*, June 23, 1932.
10. Hoffman, F. *Mortality from Cancer Throughout the World*, 1913.
11. Bashford, F. F., and Murray, J. A. *Second Scientific Report of the Imperial Cancer Research Fund*, London, 1905.
12. Hoffman, F. *Seventh Report of the San Francisco Cancer Survey*, 1931.
13. *Mortality Rates, 1910-1920*, p. 86.
14. Stevenson. *Report of the Registrar General of England and Wales*, 1917.
15. Casella, Edgar. *The World's Health*, IX:188, 1930.
16. *Twelfth Census of the United States*, 1900, vol. III, part I, p. LV.
17. Wainwright, J. M. *Am. J. Cancer*, 15:2610 (Oct.), 1931.
18. Bagg, H. J. *Proc. Soc. Exper. Biol. & Med.*, 22:419 (May 20), 1925.
19. Kennaway, E. L., and Sampson. *J. Path. & Bact.*, 31:609, 1928.
20. Ansbacher, S., and Supplee, G. C. *J. Biol. Chem.*, 105:391 (May), 1934.

Efficacy of Typhoid Prophylaxis in the United States Navy*

S. S. COOK, M.D., DR.P.H.

Lieutenant Commander, Medical Corps, U. S. Navy, In Charge, Division of Preventive Medicine, Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

TYPHOID fever was for many years a serious problem in the United States Navy and epidemics were frequent aboard ship and on shore stations. That much time and thought was expended in efforts to solve this problem is evidenced by frequent references in the reports of medical officers of the late years of the 19th century and in the early years of the 20th century.

For this study the 44 year period 1890-1933 has been chosen. The initiation of compulsory typhoid prophylaxis in 1912 serves as the dividing line separating the 44 years into 2 periods of 22 years each. There are given the annual prevalence, deaths, case fatality, and geographical distribution during the period when vaccine was not administered and for comparison during the years when vaccine was administered, also the effects of inoculations with relation to severe reactions and deaths and, for a portion of the period, an account of the incidence of typhoid fever in individuals previously inoculated.

Reports of encouraging results following the use of antityphoid prophylaxis prompted naval authorities early in 1910 to make typhoid vaccine available to those who wished to avail themselves

of it. In 1911 it was decided to require inoculation of all naval personnel, and this was done in General Order No. 133, dated December 1, 1911. This order reads:

1. As soon as practicable after the receipt of this order, typhoid prophylactic will be administered to all officers and enlisted men of the Navy and Marine Corps, under the age of 45 years, who have not already received it or who have not already had a well defined case of typhoid fever. Officers and enlisted men on leave, or on duty where no medical officer is available, will receive the typhoid prophylactic upon their arrival at the first station where this measure is practicable.

2. Typhoid prophylactic will be administered to all recruits under 45 years of age immediately upon their arrival at a training station, receiving ship, or marine recruit depot. This applies to all men reenlisting who have not received the prophylactic treatment within 2 years previously or had a well defined case of typhoid fever; in case of doubt the prophylactic will be administered. Every applicant for enlistment in the Navy or Marine Corps will be informed that he must submit to typhoid prophylaxis, and unless he agrees to acquiesce in this procedure he will not be considered for enlistment.

3. Typhoid prophylaxis must be regarded as a supplemental safeguard, and under no circumstances will the usual sanitary precautions be modified or set aside.

4. The antityphoid serum should be obtained from the Bureau of Medicine and Surgery by telegraphic or written request.

This order was promulgated to the service and immediate steps were taken to comply with its provisions. Inocula-

*Read at the Third Annual Meeting of the Southern Branch, American Public Health Association in San Antonio, Tex., November 14, 1934.

TABLE I

TYPHOID FEVER AND PARATYPHOID FEVERS, ADMISSIONS AND DEATHS, BY YEARS
UNITED STATES NAVY, 1890-1933

<i>Year</i>	<i>Mean Strength</i>	<i>Admissions</i>	<i>Admission Rate per 100,000</i>	<i>Deaths</i>	<i>Death Rate per 100,000</i>	<i>Case Fatality Rate per 100</i>
1890	11,768	41	348.40	1	8.50	2.44
1891	11,501	37	321.71	5	43.47	13.51
1892	11,775	59	501.06	7	59.45	11.86
1893	12,109	47	388.14	4	33.03	8.51
1894	12,520	53	423.32	4	31.95	7.55
1895	13,191	31	235.01	6	45.49	19.35
1896	14,196	56	394.48	10	70.44	17.86
1897	15,734	52	330.49	4	25.42	7.69
1898	23,986	109	454.43	12	50.03	11.01
1899	20,819	134	643.64	11	52.84	8.21
1900	23,756	175	736.66	25	105.24	14.29
1901	26,873	105	390.73	14	52.10	13.33
1902	31,240	125	400.13	14	44.81	11.20
1903	37,248	188	504.73	20	53.69	10.64
1904	40,555	194	478.36	21	51.78	10.82
1905	41,313	172	416.33	11	26.63	6.40
1906	42,529	230	540.81	14	32.92	6.09
1907	46,336	249	537.38	17	36.69	6.83
1908	52,913	176	332.62	10	18.90	5.68
1909	57,172	189	330.58	17	29.73	8.99
1910	58,691	193	328.84	10	17.04	5.18
1911	61,399	222	361.57	15	24.43	6.76
1912	61,897	57	92.09	2	3.23	3.51
1913	65,926	23	34.89	4	6.07	17.39
1914	67,141	22	32.77	0	0	0
1915	68,075	23	33.79	1	1.47	4.35
1916	69,294	21	30.31	0	0	0
1917	245,580	86	35.02	1	0.41	1.16
1918	503,792	83	16.48	9	1.79	10.84
1919	298,774	49	16.40	2	0.67	4.08
1920	140,773	35	24.86	7	4.97	20.00
1921	148,861	16	10.75	1	0.67	6.25
1922	122,126	12	9.83	2	1.64	16.67
1923	116,565	14	12.01	2	1.72	14.29
1924	119,280	7	5.87	0	0	0
1925	115,381	4	3.47	0	0	0
1926	113,756	4	3.52	0	0	0
1927	115,316	15	13.01	1	0.87	6.67
1928	116,047	20	17.23	2	1.72	10.00
1929	117,388	12	10.22	2	1.70	16.67
1930	117,453	18	15.33	1	0.85	5.56
1931	112,767	22	19.51	2	1.77	9.09
1932	110,717	20	18.06	3	2.71	15.00
1933	108,183	9	8.32	2	1.85	22.22

tions were begun early in 1912, and by the end of that year practically every person in the Navy to whom the order applied had received 3 injections of typhoid vaccine.

While there have been some minor modifications of the instructions it has

not been found necessary to alter materially the original method. At present, two courses of 3 injections each are generally regarded as adequate protection. The vaccine has been obtained from the Army Medical School.

In Table I are shown the admissions

and deaths from typhoid and paratyphoid fevers among officers and enlisted men of the United States Navy for the 44 year period 1890-1933. There were 3,409 admissions and 296 deaths with a case fatality of 8.68 per cent. In the 22 year period 1890-1911, in which typhoid vaccine was not administered, there were 2,837 admissions and 252 deaths and in the 22 years 1912-1933 there were 572 admissions and 44 deaths. The case fatality rate for 1890-1911 was 8.88 per cent, and for 1912-1933 it was 7.69 per cent.

There is a striking difference in admission rates and death rates in the 2 periods. From 1890 to 1911, in only 1 year was the admission rate lower than 300 per 100,000. In 6 of the 22 years the rate exceeded 500, and in 1899 and 1900 the rates were 643 and 736 respectively. There was an abrupt drop from a rate of 361 in 1911 to 92 in 1912. Antityphoid inoculation of the entire Navy was not completed until the

end of 1912 which may account for the higher rate in 1912 than for succeeding years. Except for the rate of 92 in 1912 the admission rate in the period 1912-1933 has never exceeded 35 per 100,000. In the 5 years 1913-1917, immediately following the inauguration of compulsory antityphoid prophylaxis, the rate fluctuated between 30 and 35. In the 16 year period 1918-1933 there was only 1 year when the rate exceeded 20, and in 5 of these years the rate was less than 10 per 100,000.

The decline in death rates which occurred after the introduction of compulsory antityphoid inoculation is remarkable. In the 22 years 1890-1911 there were only three occasions when the death rate was less than 20 per 100,000. In 8 of these years the rate exceeded 50, and in 15 of the 21 years it exceeded 30. In the 22 year period 1912-1933 the death rate per 100,000 was less than 3 in each year except 1912, 1913, and 1920, when it was 3, 6,

TABLE II
TYPHOID FEVER, ADMISSIONS AND DEATHS, BY YEARS
UNITED STATES NAVY, 1913-1933

<i>Year</i>	<i>Admissions</i>	<i>Admission Rate per 100,000</i>	<i>Deaths</i>	<i>Death Rate per 100,000</i>
1913	22	33.37	4	6.07
1914	13	19.36	0	0
1915	18	26.44	1	1.47
1916	17	24.53	0	0
1917	66	26.88	1	0.41
1918	65	12.90	9	1.79
1919	36	12.05	2	0.67
1920	28	19.89	6	4.26
1921	13	8.73	1	0.67
1922	8	6.55	2	1.64
1923	11	9.44	2	1.72
1924	5	4.19	0	0
1925	3	2.60	0	0
1926	3	2.64	0	0
1927	9	7.81	1	0.87
1928	9	7.76	1	0.86
1929	7	5.96	1	0.85
1930	11	9.37	1	0.85
1931	16	14.19	2	1.77
1932	12	10.84	3	2.71
1933	6	5.55	2	1.85

and 5 respectively. In the 19 years when the death rate was less than 3 there were no deaths in 5 of the years, and in 5 others the rate was less than 1. The death rate declined abruptly from 24 in 1911 to 3 in 1912.

Prior to 1913, typhoid fever and paratyphoid fevers were not separated in morbidity reports. In Tables II and III admissions and deaths for typhoid fever and for paratyphoid fevers from 1913 to 1933 are shown.

It may be seen in Table II that typhoid fever caused 378 admissions and 39 deaths in the 21 year period 1913-1933. This gives an average of about 18 cases and 2 deaths per year in a population of approximately 142,000. If the war years of 1917 and 1918 are excluded a better idea of the usual prevalence is obtained. Thus, in 19 of the years since antityphoid inoculation has been in use there has been an average of about 13 cases and 1 death in a population of approximately 118,000.

In Table III are shown admissions and deaths, by years, for paratyphoid fevers for the period 1913-1933. There were 137 admissions and 3 deaths. From 1912 to 1917 straight typhoid vaccine was used. From October, 1917, until the summer of 1924 a triple vaccine, which contained typhoid, paratyphoid A and paratyphoid B organisms, was given. Since 1924 straight typhoid vaccine has been used. There does not appear to have been a marked decrease in the prevalence of paratyphoid fevers as a result of the use of the triple vaccine. The numbers of cases are too small to warrant definite statements one way or the other.

In Table IV are shown annual death rates per 100,000 strength, United States Navy, and per 100,000 population, Registration Area of the United States, 1900-1929.

During the first 5 years of this period Navy death rates were consistently higher than those of the Registration

TABLE III
PARATYPHOID FEVER, ADMISSIONS AND DEATHS, BY YEARS
UNITED STATES NAVY, 1913-1933

<i>Year</i>	<i>Admissions</i>	<i>Admission Rate per 100,000</i>	<i>Deaths</i>	<i>Death Rate per 100,000</i>
1913	1	1.52	0	0
1914	9	13.40	0	0
1915	5	7.35	0	0
1916	4	5.77	0	0
1917	20	8.14	0	0
1918	18	3.57	0	0
1919	13	4.35	0	0
1920	7	4.97	1	0.71
1921	3	2.02	0	0
1922	4	3.28	0	0
1923	3	2.57	0	0
1924	2	1.68	0	0
1925	1	0.87	0	0
1926	1	0.88	0	0
1927	6	5.20	0	0
1928	11	9.48	1	0.86
1929	5	4.26	1	0.85
1930	7	5.96	0	0
1931	6	5.32	0	0
1932	8	7.23	0	0
1933	3	2.77	0	0

TABLE IV

TYPHOID FEVER AND PARATYPHOID FEVERS.
ANNUAL DEATH RATES PER 100,000
STRENGTH, UNITED STATES NAVY, AND PER
100,000 POPULATION, REGISTRATION AREA OF
THE UNITED STATES, 1901-1929 *

Year	United States Navy	Registration Area of the United States
1900	105.24	35.9
1901	52.10	32.4
1902	44.81	34.5
1903	53.69	34.4
1904	51.78	32.0
1905	26.63	27.8
1906	32.92	32.1
1907	36.69	30.3
1908	18.90	24.3
1909	29.73	21.1
1910	17.04	23.5
1911	24.43	21.0
1912	3.23	16.5
1913	6.07	17.9
1914	0	15.5
1915	1.47	12.4
1916	0	13.3
1917	0.41	13.5
1918	1.79	12.6
1919	0.67	9.2
1920	4.97	7.8
1921	0.67	9.0
1922	1.64	7.4
1923	1.72	6.8
1924	0	6.7
1925	0	8.0
1926	0	6.5
1927	0.87	5.5
1928	1.72	4.9
1929	1.70	4.2

* The death rates for the Registration Area of the United States for the period 1900-1919 are those shown in Mortality Statistics under Title No. 1, *International Nomenclature* for typhoid fever and paratyphoid fevers and for 1920-1929 under Title No. 1a for typhoid fever and No. 1b for paratyphoid fevers.

Area. Beginning with 1905 and continuing through 1911, Navy rates paralleled quite closely those of the Registration Area. From 1912 on there is no similarity. The death rate in the Navy dropped from 24 in 1911 to 3 in 1912, while in the Registration Area it dropped from 21 to 16. The decline in the Navy was precipitous whereas in the Registration Area the decline, which had

been in progress since 1900, continued in an orderly but gradual fashion. So far as can be determined the only change which was made in the Navy in 1912 that was not made in the Registration Area was the inauguration of antityphoid inoculation. Such improvements as were effected in sanitation including water purification doubtless affected the Navy as well as the civilian population. If it were found that the principal sources of infection for the Navy were localities where notable sanitary improvements had been made in 1912 this factor would of necessity require consideration.

The geographic distribution of typhoid fever in the Navy, 1900-1912, is here given in sufficient detail to substantiate the statement that the disease was prevalent in the Navy in a number of localities both in the United States and elsewhere.

GEOGRAPHIC DISTRIBUTION

Abstracts are given from official records in chronological order:

1900—Island of Guam, 18 cases; a ship, Atlantic Fleet, 4 cases; Gavite, P. I., 26 cases; a ship, Asiatic Fleet, 11 cases.

1901—Asiatic Station, 19 cases; a ship, Atlantic Fleet, 9 cases.

1902—Training Station, San Francisco, 7 cases.

1903—San Juan, P. R., 7 cases in Atlantic Fleet; Naval Academy, Annapolis, Md., 7 cases; Navy Yard, Norfolk, Va., 6 cases; Navy Yard, Philadelphia, Pa., 9 cases; a ship, Atlantic Fleet, 7 cases.

1904—Portsmouth, N. H., 22 cases; Receiving Ship (U. S. S. *Franklin*), Norfolk, Va., 11 cases; a ship, Atlantic Fleet, 13 cases.

1905—Training Station, Newport, R. I., 12 cases; Receiving Ship (U. S. S. *Franklin*), Norfolk, Va., 16 cases; Naval Academy, Annapolis, Md., 11 cases; Asiatic Fleet, 16 cases.

1906—A ship, Atlantic Fleet, 44 cases; Naval Academy, Annapolis, Md., 9 cases; Training Station, Newport, R. I., 16 cases; Asiatic Fleet, 8 cases; Foreign Stations, 13 cases.

1907—A ship, Atlantic Fleet, 8 cases; Foreign Stations, 11 cases; Asiatic Fleet, 9 cases.

1908—Norfolk, Va., 31 cases; Las Animas, Colo., 28 cases.

1909—Atlantic Fleet, 98 cases; Chelsea, Mass., 24 cases.

1910—Receiving Ship (U. S. S. *Franklin*), Norfolk, Va., 17 cases; a ship, Atlantic Fleet, 12 cases; Foreign Stations, 5 cases.

1911—Marines, Guantanamo Bay, Cuba, 11 cases; Foreign Stations, 16 cases.

1912—Fourteen ships and 8 shore stations reported 1 case each.

TYPHOID PROPHYLAXIS

Data are available for the 9 year period 1925–1933 with regard to the number of injections given in these years and the reactions and deaths resulting therefrom. These are shown in Table V. There were 291,796 complete

injections caused 8,773 moderately severe reactions, in 2,125 instances the reaction was of sufficient severity to require admission to the sick list, and there was 1 death. There was 1 moderately severe reaction to 102 injections and 1 admission to the sick list to 421 injections. In other words, some type of reaction followed slightly more than 1 per cent of the injections.

During the 10 year period 1924–1933 there were 81 cases of typhoid fever, and of this number 73 had records of previous inoculations with typhoid vaccine. Of the remaining 8, 1 had received 1 injection; 4 had not been inoculated; and for 3 there is no record.

TABLE V

TYPHOID PROPHYLAXIS, UNITED STATES NAVY, 1925–1933

	First-Course Inoculations	Second-Course Inoculations	Total
Number administered	620,135	275,545	895,680
Moderately severe reactions	7,751	1,022	8,773
Per cent	1.25	0.37	0.98
Reactions requiring admission to sick list	1,825	300	2,125
Per cent	0.29	0.11	0.24

courses of 3 inoculations each, January 1, 1925, to December 31, 1933.

Deaths resulted from antityphoid inoculations as follows: 1918, 2; 1923, 1; and 1926, 1.

During the 9 year period 895,680 inoculations were given. These inocu-

The time interval between inoculation and admission with typhoid fever is shown in Table VI.

It may be seen that 5 individuals developed typhoid fever within 6 months of the completion of inoculation, and slightly more than one-half the total

TABLE VI

TYPHOID FEVER IN PERSONS PREVIOUSLY INOCULATED, UNITED STATES NAVY, 1924–1933
INTERVAL BETWEEN INOCULATION AND ADMISSION

Year	0–6 Mos.	6 Mos.–1 Yr.	1–2 Yrs.	2–3 Yrs.	3–4 Yrs.	4 Yrs. +	Total
1924	2	..	..	1	1	..	4
1925 . . . . .	..	1	..	2	..	1	4
1926 . . . . .	..	..	..	1	..	1	2
1927 . . . . .	..	2	2	1	1	2	8
1928	1	1	3	2	1	..	8
1929	1	2	..	1	1	..	5
1930	1	3	1	3	2	1	11
1931 . . . . .	..	1	11	2	1	1	16
1932 . . . . .	..	1	2	3	3	1	10
1933 . . . . .	..	1	1	3	..	..	5
Total	5	12	20	19	10	7	73

cases occurred between 1 and 3 years after receiving 3 injections of typhoid vaccine. It is noted that there was an increase in the numbers of cases in 1930, 1931, and 1932, as compared to the years immediately preceding. The 11 cases in 1930 were reported from widely separated places under varying conditions of exposure. Of the 16 cases in 1931, 12 were reported in Marines in Nicaragua. An earthquake in March, 1931, caused extensive damage to the water works in Managua and for several months thereafter the water was grossly polluted. The water supply of the Marine Camp was chlorinated but there were numerous opportunities for exposure in the city. In 1932 there were 10 cases and of these 8 occurred in China.

SUMMARY

Typhoid prophylaxis was instituted in the Navy in 1912 and has been consistently practised since. Specific

prophylaxis has consisted of the administration of typhoid vaccine to all persons in the Naval service.

Coincident with the prophylaxis a marked reduction in the incidence of typhoid fever occurred. This reduction is believed to have been due in large measure to the immunization of the personnel. The incidence of typhoid fever has gradually declined in the Registration Area of the United States. Since 1900 this decline has been more gradual than that observed in the Navy and has at no time shown the marked drop comparable to that in the Navy in 1912.

In the 9 year period 1925-1933, 895,680 injections of typhoid vaccine were given. As a result of these injections there were 1 death and 10,898 reactions. Some type of reaction followed slightly more than 1 per cent of the injections.

In the 10 year period 1924-1933 there were 73 cases of typhoid fever among persons who had received 3 or more injections of typhoid vaccine.

Less Lead Permitted on Apples and Pears

IN a notice addressed to both consumers and producers of apples and pears, Secretary of Agriculture Wallace announced a further restriction in the quantity of lead residue permitted on these fruits in interstate commerce. The tolerance specified for the crops of 1935 is 0.018 grain of lead to a pound of fruit.

The reduction was made despite requests from some quarters that the restrictions be relaxed, the Secretary adding that "expectation of continued progress downward is fully justified" and "relaxation in the lead restriction would be wholly incompatible with public safety." U. S. Dept. of Agriculture, *Press Release*, Jan. 25, 1935.

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Efficacy of Typhoid Prophylaxis in the United States Army*

MAJOR GENERAL ROBERT U. PATTERSON

The Surgeon General of the U. S. Army, Washington, D. C.

BEFORE discussing the efficacy of typhoid prophylaxis, or so-called typhoid vaccination, it is desirable to refer to the history of the procedure and then trace its development up to the present time.

As early as 1886, Fränkel and Simmonds¹ found that several small non-lethal doses of typhoid bacilli would protect rabbits against subsequent fatal doses. In the same year, Beumer and Peiper² immunized mice with potato cultures of typhoid bacilli, and by using small but increasing doses they were able to give definite protection subsequently against what ordinarily would have been fatal doses. They suggested the use of sterilized or killed cultures to be used for the immunization of men, but made no investigations or experiments themselves. Chantemesse and Widal,³ in 1888 Sanarelli, and others reported work on animals of similar character, but as practically nothing was then known of the toxin of the typhoid bacillus or of the nature of typhoid immunity, little or nothing came of their work. In 1892, Brieger, Kitasato, and Wassermann⁴ demonstrated that it was unnecessary to use living bacilli, since killed cultures were

part of the body of the bacillus. Both filtrates, which had been used to some extent up to that time, were effective only in so far as they contained particles of bacterial cells.

All of the earlier work on animals was incomplete and unsafe as a guide in the immunization of man, as at that time there was no way of detecting changes in the blood serum after inoculation and, consequently, no way of knowing that protection had been conferred. It was not until 1894 and 1895 that Pfeiffer,⁵ working with Wassermann, Kolle, and Issaeff, discovered the nature of the immunity in cholera and typhoid and at the same time elaborated a method of measuring its quantity. They recognized that the character of the immunity and its degree depended upon the presence of bacteriolytic immune bodies in the blood serum, and the test formulated at that time has since become classic under the name of the "Pfeiffer phenomenon." The test is made by inoculating a series of guinea pigs intraperitoneally with fatal doses of cholera or typhoid mixed with diminishing quantities of immune sera followed by examination of the peritoneal exudate for signs of degeneration in the bacteria. If they are dissolved and the pigs live, the phenomenon is present; if the bacteria are not attacked the pigs die and the test is negative. Until the discovery of agglutinins and, later, of opsonins, the entire fabric of

1926
 1929
 1930
 1931
 1932
 1933
 Total

* Annual Meeting of the
 Public Health Association
 September 14, 1934.

proof of the efficacy of immunization depended upon the demonstration of bacteriolytic amboceptors in the blood serum. The results obtained by this test proved conclusively in both animals and man the possibility of producing a high degree of immunity against typhoid by the use of killed cultures.

The first actual immunization of men for the purpose of protecting them against typhoid was made by Pfeiffer and Kolle⁶ in 1896. They immunized two men and investigated the specific changes in the blood serum thoroughly and exhaustively. They showed that not only were agglutinins produced, but what is more important, the bacteriolytic power of the blood was also raised in the same way as during an attack of typhoid. So far as was known then, we had the same antibodies produced as the result of inoculation as were produced during an actual attack of the disease. It was therefore not unreasonable to expect that the immunity conferred by prophylactic inoculation would last for a considerable period.

Sir A. E. Wright,⁷ who in 1896 was connected with the Medical Corps of the British Army, had injected killed cultures of typhoid bacilli into two men a few weeks before Pfeiffer and Kolle, but the inoculations were apparently made in the course of investigation on the coagulability of the blood, since he reported no studies of the specific changes in the blood. In the next year (1897),⁸ however, he published the results of antityphoid inoculations upon 18 men and became convinced by this experience that the method was practicable and that it gave sufficient protection to make it worthy of adoption in the Army.

In 1898, Wright introduced typhoid prophylactic inoculation into the British Army in India, with results which were on the whole very good and encouraging. Wright used broth cultures which had been incubated for 3 weeks and then

killed by heating to 60° C. for 1 hour. The size of the dose used was the quantity required to kill a small guinea pig.

During the Boer War, Wright recommended that the troops be inoculated. Four hundred thousand doses were furnished, but it is not known how many received the vaccine. Statistical reports were poor, the opinions of organization surgeons differed, and although Wright was convinced from the data he had collected that both morbidity and mortality were reduced, the procedure was not popular.

Sir William Leishman⁹ says relative to the Boer War experience:

The methods then employed in the preparation of the vaccine may have resulted in considerable variations in its vaccinating efficiency. Some men may have received but slight and transient immunity, while others were protected in as high a degree as the system was capable of.

No doubt overheating the vaccine was one of the main factors in obtaining lack of uniformity of results.

Following the Boer War, the next extensive use of typhoid vaccine was in the German Colonial Army in South Africa from 1904 to 1907. In 1904 the Germans had 226 cases of typhoid among their troops and, upon the advice of Professor R. Koch, prophylactic vaccination was employed with the result that the number of cases fell to 43 during 1907.

Kuhn¹⁰ has reported the results of this work which may be summed up as follows:

Sixteen thousand four hundred and ninety-six men were sent to the Colonial Army. A call for volunteers resulted in 7,287 men being vaccinated. Large doses of vaccine were given and reactions were severe. One thousand two hundred twenty-seven cases of typhoid developed; among the unvaccinated the percentage of cases was 9.84, and among the vaccinated 5.09.

Figures I and II give the result of this work.

FIGURE I

TYPHOID PROPHYLAXIS

GERMAN AFRICAN EXPERIENCE 1904-1907

— KUHN —

Severity of Cases in Unvaccinated and Vaccinated

Type of Case	Unvaccinated		Vaccinated	
	No.	Per Cent	No.	Per Cent
Light	331	37	186	50
Moderately severe	225	25	96	26
Severe	234	25	65	18
Fatal	116	13	24	6

Early in the experimental work it was found that the age of the vaccine had considerable effect upon its immunizing properties. This no doubt accounted for some of the failures during the Boer War.

The strain of organism used by Leishman in his work was taken from a spleen at autopsy and was so old that it was thought at that time to have little virulence. Even in the early days there was some controversy as to whether or not a virulent or nonvirulent strain should be used. Wassermann and Strong both showed that virulence had little to do with producing antibodies in animals. Leishman confirmed this work and stated that vaccine made from virulent strains produced much greater constitutional reactions among those inoculated.

When vaccination was reintroduced into the British Army after 1904, Leishman reported the results in India among 19,000 troops, about half of whom were

vaccinated. The case incidence among the vaccinated was 5.39 per 1,000, while among the unvaccinated it was 30.4. The case fatality among the vaccinated was 8.9 per cent, among the unvaccinated 16.9 per cent.

In 1908, Captain F. F. Russell, Medical Corps, U. S. Army, was sent to Europe to make a study of the methods of inoculation for typhoid fever in use in England and Germany. Upon his return a board of officers was organized to investigate the advisability of immunizing our own Army. In addition to the Surgeon General and Russell, a number of prominent medical men, members of the Reserve Corps, were made members of the board. The board was actually composed of Surgeon General O'Reilly, as President, Captain F. F. Russell, Victor C. Vaughan, Simon Flexner, William C. Councilman, John H. Musser, Alexander Lambert, and William S. Thayer. Thus, with the exception of two members of the Regular

FIGURE II

TYPHOID PROPHYLAXIS

GERMAN AFRICAN EXPERIENCE 1904-1907

— KUHN —

Relation of Severity of Case to Number of Doses of Vaccine Administered

Type of Case	One Dose	Two Doses	Three Doses
Light	31.7%	48.9%	19.4%
Moderately severe	23.9%	48.9%	27.1%
Severe	41.5%	43.1%	15.4%
Fatal	58.3%	33.3%	8.3%

FIGURE III

**TYPHOID AND TYPHUS FEVERS, WHITE ENLISTED MEN UNITED STATES ARMY
ADMISSIONS AND DEATHS, 1920 - 1910**

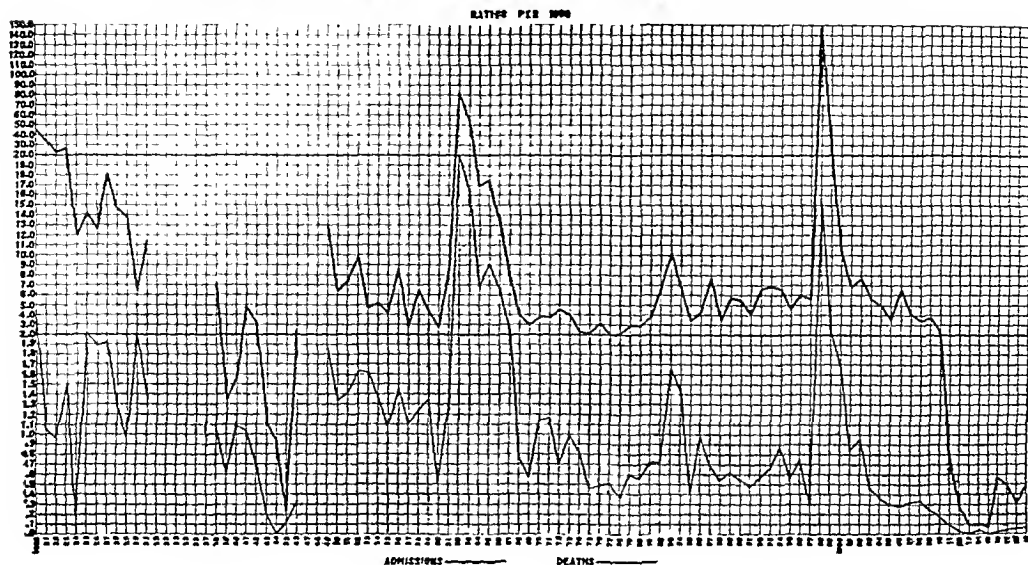
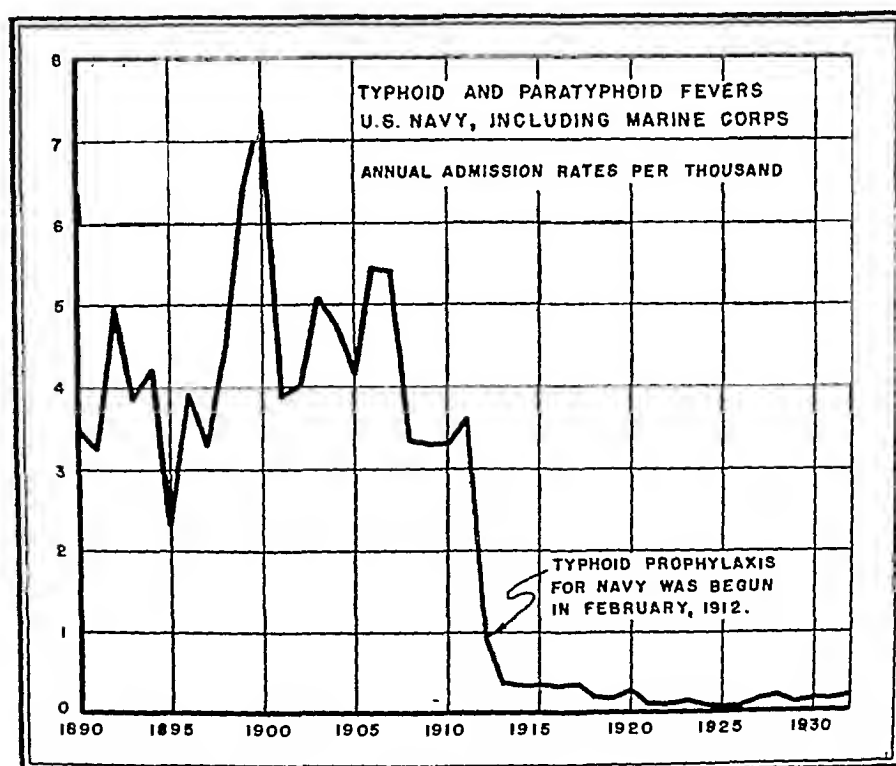


FIGURE IV



Army Medical Corps, the board was composed of leaders of the medical profession in civil life, who gave their valuable time to this work for more than a week, at very considerable financial loss to themselves, as a patriotic duty. Not only the Army but the whole country owes a great deal to these men.

The board was convinced that vaccination was both useful and harmless and recommended its introduction into the Army as a voluntary measure, especially among what was then called "the Hospital Corps" of the Army, the Nurse Corps, and troops taking the field.

On June 14, 1910, 92 men of Company A, First Battalion, Engineers, were vaccinated. On June 24, the company left Washington for Gettysburg, Pa., for maneuvers. The total strength of the company was 118 men. Ninety-two had received at least 1 dose of typhoid vaccine, 2 gave a history of typhoid, leaving 24 unprotected. On August 11, 5 days after returning home, 2 cases of typhoid appeared among the unvaccinated, and 4 others developed between the 20th and 23rd of that month, also among the unvaccinated. No cases developed among the vaccinated, while 25 per cent of the unprotected developed the disease.



FIGURE V—CAPTAIN F. F. RUSSELL

The first volunteers to take typhoid prophylaxis were medical officers stationed in and around Washington in the spring of 1909. Russell then desired to have it introduced among the troops. The first *organization* of the Army to submit to typhoid prophylaxis was Company C of the Hospital Corps, in the spring of 1909. At that time, as a Captain of the Medical Corps, I was in command of that company and Russell



FIGURE VI—Captain F. F. Russell giving the first typhoid vaccine at Army Medical School, 1911

asked me to try to get all the men to submit to the prophylaxis. The First Lieutenant of the organization was Mahlon Ashford (now Colonel, Medical Corps). There was no difficulty in persuading the men to take the complete series of injections, following a short address in which I explained to them the seriousness of typhoid fever, its mortality rate and some of the sequelae, and the expected beneficial results if the practice advocated by Russell were followed. Lieutenant Ashford gave me an injection and, in turn, I gave him one. Seeing the officers take it first no doubt was a factor in leading the men to submit themselves to the experiment. Ninety-five per cent of our company took the inoculation. They were promptly followed by Companies A and B of the Hospital Corps which, in turn, resulted in many officers and enlisted men of the line of the Army submitting to the inoculation.

In 1911, 2 brigade and 1 division maneuver camps were established in the southwest and vaccination was made compulsory among those troops. The results were excellent, and compulsory vaccination for the whole Army under 45 years of age was put into effect by General Order No. 134, War Department, September 30, 1911.

Figure XI presents graphically the number of cases and the deaths from typhoid fever beginning with the year 1897, through the years of the Spanish-American War, the World War and up to the present time. During the World War, in a mean annual strength of 4,128,479 men in the Army, there were only 1,529 cases of typhoid fever with 227 deaths. The distribution of these cases is shown in Figure X.

During the last 10 years we have had only 83 cases of typhoid fever in the Army. About a quarter of these occurred in 1931 among men of one battery of field artillery engaged in a practise march in the middle west, during which hygiene

was neglected. An analysis shows that in 14 there was no record of vaccination. Someone had "slipped up" when they were enlisted.

TYPHOID IN THE CIVILIAN CONSERVATION CORPS

The Civilian Conservation Corps came into being early in 1933. Men were examined at Army stations, vaccinated against smallpox and typhoid, and then sent to over 1,000 camps throughout the country, many of which were in endemic typhoid areas.

During the calendar year 1933, it is estimated that 450,000 men were in these camps at various times. The average strength for the 39 weeks was about 223,000, but many remained a short time or left at the end of their 6 months' service. Among this number there were 54 cases of typhoid fever with 4 deaths. Twenty-nine cases, with 1 death, occurred among men of one company in Texas, where working parties had used untreated water from shallow wells under very unsanitary conditions. An inspector stated:

Conditions in the environs of this house are indescribable and it is known that one case, at least, drank water in this house. It is also known that several of the men who are now infected and suspected, at least, drank from a spring from the northern slope, and that several others waded and even bathed in the stagnant puddles on the work site, although they admitted having been warned against the above.

While food and water were taken to these men by truck daily, in the ravine near their camp was a water course, to which the inspector refers, and which consisted mainly of stagnant pools. A few inhabitants lived along the ridges, poor people without any sanitary conveniences. In one wretched house lived a family of 7. All wastes of every description were freely thrown out or placed on the surrounding ground. In one house a year before there had been 2 cases of typhoid fever, with 1 death,

FIGURE VII

WHAT MIGHT HAVE HAPPENED FROM TYPHOID FEVERS DURING THE WORLD WAR HAD THE RATES BEEN THE SAME AS DURING PREVIOUS WARS

Number of Cases and Deaths

	<i>As Actually Happened During the World War</i>	<i>As Might Have Happened During the World War, Based on Annual Rates per 1,000 Strength During the</i>		
		<i>Civil War</i>	<i>Span. Am. War</i>	<i>Phil. Ins.</i>
Cases	1,529	143,052	623,607	47,849
Deaths	227	48,757	65,313	6,358

and laboratory tests showed that carriers were then living in this house.

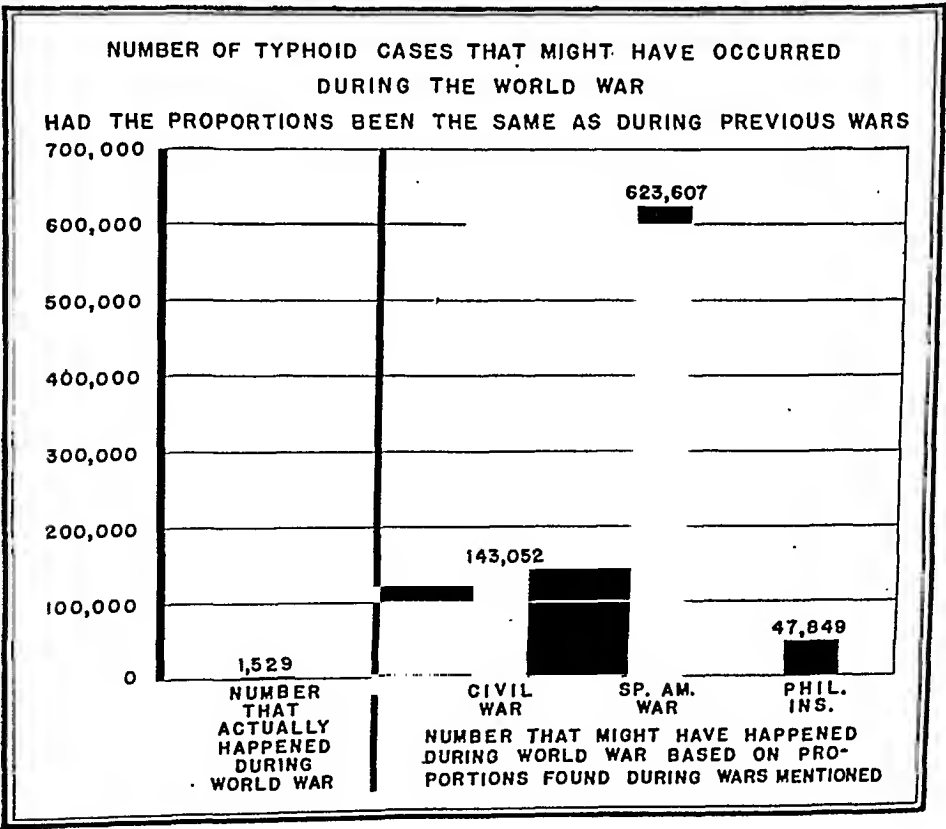
When the Army began to make vaccine at the Army Medical School in 1909, a sub-strain of the Rawlins strain used by the British was obtained.

Much thought had been given to the selection of a proper strain by the British, particularly Leishman. The reasons for selecting this strain were

(1) low toxicity for guinea pigs and man, (2) satisfactory stimulation of certain antibodies, (3) produced uniform diffuse growth and was not agglutinated by normal salt solution.

Beginning in 1917, and from time to time since then, the efficacy of the Rawlins strain has been questioned. Weiss¹¹ challenged it on account of its inability to ferment xylose as a number

FIGURE VIII



of other strains did. This matter was cleared up later by showing that certain strains were slow fermenters and acted through the formation of "daughter colonies." Following this, objection was made because the so-called somatic or "O" type antigens were not produced in man in such concentrations as are observed after recovery from typhoid. That the titer of these "O" antibodies has a direct bearing on immunity is probably erroneous.

The latest objection to the vaccine grew out of a recent controversy as to the effectiveness of vaccine prepared from the so-called "rough" and "smooth" strains. Recently it has been shown that a strain of typhoid organisms may be made to produce either "rough" or "smooth" colonies under certain laboratory conditions. It may be interesting to cite a few cases where living typhoid bacilli were taken into the mouth in the laboratory:

In a case observed by Grant in 1921, an assistant working in the Eighth Corps Area Laboratory of the Army sucked into his mouth 0.5 c.c. of a heavy suspension of living typhoid culture strain K110. His mouth was washed out with 50 per cent alcohol and he was given 0.5 c.c. of Army vaccine. Four days later he developed headache and malaise, but there was no fever or other symptom except slight headache on the 8th day. Typhoid bacilli were isolated from the feces on the 12th day after the accident, and again on the 3 succeeding days, but none were found in the blood. This man had received the U. S. Army vaccine fourteen months previously.

In 1922, Sergeant George F. Luippold, Medical Department, while working in the Vaccine Department at the Army Medical School, swallowed approximately 25 c.c. of a saline suspension of the U. S. Army Rawlins culture containing about 3,000 million organisms per c.c. After rinsing his mouth with a cresol solution and with alcohol, he was given a subcutaneous injection of vaccine and kept in bed for one week. Cultures of stool, urine, and blood taken during this week were negative. On the 4th day he developed a temperature of 101, which disappeared after 2 days, and aside from a sore throat there were no other symptoms. Prior to this accident,

the Sergeant had received three complete courses of Rawlins vaccine, the last one 2 years previously, in 1920.

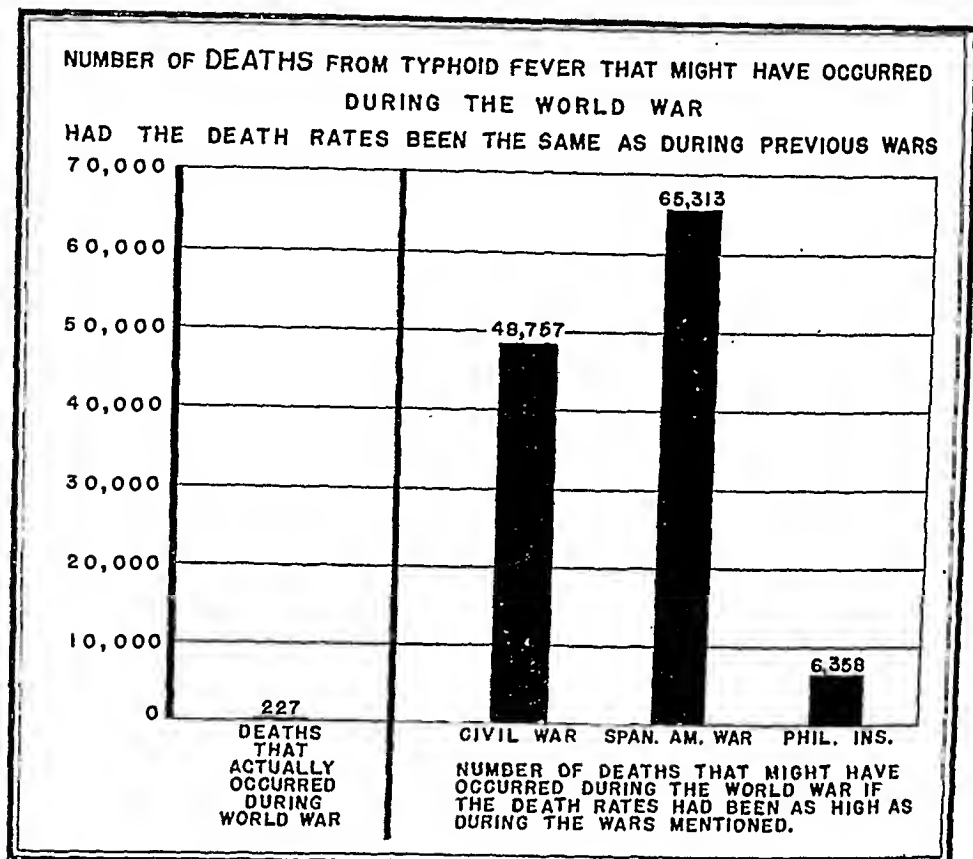
Major General Harry L. Gilchrist (retired), formerly Chief of the Chemical Warfare Service, and Colonel E. B. Vedder (retired), now Professor of Preventive Medicine at George Washington University, with 6 privates of the Medical Department, became ill with typhoid fever in August and September, 1904, during experiments with typhoid vaccine, being made to prove that killed broth cultures ingested were harmless. Unfortunately, they had not been heated at a high enough temperature to sterilize them, with the result that these 8 men contracted typhoid fever. Happily, there were no fatalities. General Gilchrist, at that time Captain in the Medical Corps, to encourage the men to take the dose with him, took twice the quantity taken by any of the others.

From the time of its introduction until July, 1917, the Army vaccine consisted of a saline suspension of the Rawlins strain grown on beef extract agar and killed by heating to between 53 and 54° C. for an hour. The vaccine was standardized at 1,000 million organisms per c.c. by the Harrison method, in which washed red blood cells were used for comparison. Later it was shown that by this method the actual bacterial count is only about one-half that of the count estimated by this method, so that during this period the vaccine consisted of approximately only 500 million organisms per c.c.

In July, 1917, 750 million paratyphoid "A" organisms and a like amount of paratyphoid "B" were added, Harrison's method of counting being used.

In July, 1919, the direct method of counting in a Helber chamber was adopted, which resulted in doubling the quantities of each component of the vaccine; and in April, 1920,

FIGURE IX



the nephelometer was introduced, using standards established by counts in a Helber chamber. The standards became more and more opaque with age, resulting in increasingly higher contents of the vaccine. This was not recognized until some time in 1923. Meanwhile the reactions had become so severe that in February, 1922, the paratyphoids were reduced to 500 million each, but as this was estimated by the nephelometer, there actually remained almost 1,500 million paratyphoid organisms. When the error in this method of counting was discovered in 1923, the actual count was approximately 1,750 million typhoid and a like number of paratyphoid organisms, a strength of 3,500 million as compared with the prescribed strength of 2,000 million. In March, 1924, vaccine was issued in which the direct count was 500 million typhoid and 250

million each of paratyphoid "A" and "B." At this time the Navy discontinued the paratyphoid fraction entirely and their vaccine was standardized at 1,000 million typhoid organisms and has been held at that since. The method of preparation of the vaccine at this time was also changed. Veal infusion agar was substituted for beef extract media and the killing point increased to 56° C. for 1 hour. In October, 1927, the paratyphoid "B" fraction for Army personnel was also discontinued and the typhoid fraction increased to 750 million per c.c. Beginning on April 1, 1934, the paratyphoid "A" fraction was discarded and the typhoid fraction increased to 2,000 million. This monovalent vaccine is the one now in use in the service. Recently, after an extensive investigation at the Army Medical School, Hawley and Simmons have come to the

FIGURE X

TYPHOID FEVER

DISTRIBUTION OF WORLD WAR CASES

Race, Rank and Country	Cases	Rate per	Deaths	Death Rate
		1,000		per 1,000
Total officers	49	.24	7	.03
Enl. white, U. S.	483	.25	54	.03
Enl. colored, U. S.	45	.31	17	.11
Enl. white, Europe	776	.53	123	.08
Enl. colored, Europe	23	.19	8	.07
Color not stated, Europe	59	...	13	...
Enl. white, Hawaii	50	3.09	4	.25
Enl. other countries and on transports	42	...	1	...
Native troops	2	.06	...	...

There were no cases in Panama or Philippines among the white or colored troops.

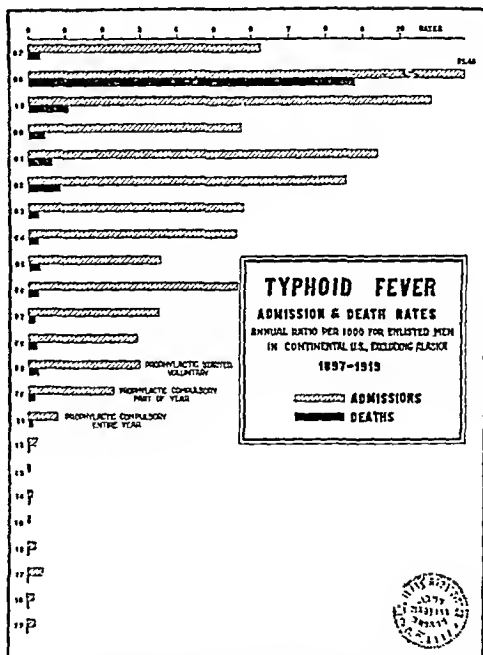
conclusion that the Rawlins strain *may not be* the best typhoid vaccine strain, but it is their belief that the sub-strain used at the Army Medical School is no worse today than it ever was; nor has it been proved that the present state of this sub-strain is not the optimum for the prevention of typhoid fever in man, or that when the optimum dissociative state has been determined the Rawlins strain cannot be so maintained.

The new vaccine was issued so that it could be put into effect all over the country on April 1, 1934. Corps Area Surgeons were instructed to submit reports relative to the severity of reactions, etc., as compared with the old vaccine. As a result, a mass of material has been accumulated which is now being analyzed in my office.

Some reports state that it causes more reactions, and some less, while many note no difference. One of the most comprehensive reports (Fort Sheridan) shows a comparison between the old type of vaccine used at the second C.C.C. enrollment and the new which was used at the third. The figures are as follows:

	Number of Men Vaccinated	Number Admitted to Sick Report as Result of Reactions	Rate per 1,000
Second Enrollment	10,984	138	11.74
Third Enrollment	7,873	74	8.21

FIGURE XI



The Surgeon submitting this report states:

It is believed that the hospital admission rate does not reflect adequately the decreased toxicity of the new vaccine, as among men sent to hospitals the subjective symptoms were apparently much less disagreeable and the evidences of prostration were much milder than was formerly the case.

There seems to be considerable evidence that when reactions occur, they usually follow the second dose rather than either the first or third.

The result of typhoid prophylaxis in the United States Army is indicated most graphically in Figures VII, VIII, and IX.

During the World War more than 4,000,000 men were mobilized and among that great number there were but 1,529 admissions to sick report as the result of typhoid fever, or 1 admission for every 382 that occurred during the Spanish-American War in an Army averaging less than 207,000. Instead of our camps during the World War being hotbeds of infection, they were almost free from typhoid fever. In Manila, P. I., during the War Period (1917-1919 inclusive), there was but 1 case of typhoid fever among all the American and native troops, while among the civilian population there were 1.8 per 1,000 during each of these 3 years.

The man most responsible for this wonderful achievement, resulting in the saving of thousands of lives and the prevention of needless suffering to thousands of others, an accomplishment which was a real contribution in maintaining the man-power and the effectiveness of our Army during the World War, was Frederick F. Russell. He was the leader whose report of his observations and studies in Europe in 1908 convinced the board of distinguished scientists of the desirability and practicability of the introduction of killed cultures of typhoid bacilli as a means of producing protective immunizing bodies in man. The complete demonstration of the efficacy of this procedure in our Army on such a large scale served also to convince other armies of its value, and it was early introduced by the civil profession into their prac-

tice. In these days it is being carried out more and more as a routine public health measure.

While we are never justified in relaxing our general sanitary measures for the prevention of this disease, and it is known that at times typhoid prophylactic vaccination will not afford complete protection, particularly so against a gigantic or very virulent focus of infection, nevertheless when troops *do* contract typhoid fever in spite of prophylactic vaccination, the death rate is practically nil.

I have referred to the conclusions of Hawley and Simmons in "The Effectiveness of Vaccine Used in the Prevention of Typhoid Fever in the U. S. Army and Navy," in July, 1934, *American Journal of Public Health*. In view of their conclusions, it was the opinion of our immunologists that the Army vaccine could be improved by increasing its bacterial content, within the limits of safety. That is the reason we have reverted to a monovalent vaccine, as used between the years 1909 and 1917, though it is now more potent. To date the results have been excellent, as shown by its effectiveness among the large number of men who have been enlisted in the Army, and in other groups in this country.

The Director of Laboratories of the Army Medical School and his assistants are engaged in a series of careful investigations concerning the efficiency of the Rawlins strain now in use in our Army, with a view to ascertaining whether the same strain should be continued or a new one developed. This work will be carried on continuously over a long period. The present strain is working very satisfactorily wherever used in this country. However, there may be room for improvement, and the work indicated is going forward to reach a determination of this question.

REFERENCES

1. Frankel, E., and Simmonds, M. Hamburg, L. Voss, 1886.
2. Beumer and Peiper. *Zentralbl. klin. Med.*, VII: 633-5, 1886.
3. Chantemesse, A., and Widal, F. *Ann. de l'Inst. Pasteur*, II:54, 1888.
4. Brieger, L., Kitasato, S., and Wassermann, A. *Zschr. f. Hyg. u. Infektionskr.*, XII:137-82, 1892.
5. Pfeiffer, R. *Zschr. f. Hyg. u. Infektionskr.*, XVI:268-86, 1894.
- Pfeiffer, R., and Issaëff. *Ibid* XVII:355-400, 1894.

- Pfeiffer, R. *Ibid* XVIII:1-16, 1894.
- Issaëff and Kolle. *Ibid* XVIII:17-41, 1894.
- Kolle. *Ibid* XVI:329-61, 1894.
6. Pfeiffer, R., and Kolle, W. *Deutsch. med. Wchnschr.*, XXII:735, 1896.
7. Wright, E. A. *Lancet*, 1896, p. 807.
8. Wright, E. A. *Brit. M. J.*, 1897, p. 16.
9. Leishman, W. B. Harben-Lectures. *J. Roy. Inst. Pub. Health*, July, Aug., and Sept., 1910.
10. Quoted by Russell, F. F. *New York State J. Med.*, X:535, 1910.
11. Weiss, H. *J. Med. Res.*, XXXVI:135, 1917.

Sickness Insurance of School Children in Switzerland

SICKNESS insurance of school children, as a supplement to insurance of adults, is required by law in 8 of the 25 cantons of Switzerland, among them Geneva and Saint Gallen; in 7 other cantons, including Bern and Zurich, such insurance is required only in some communes. In several cantons the insurance law applies only to children attending kindergarten or elementary public school; in others it applies to all children of certain ages, whether they attend school or not.

Each insured child pays into the insurance fund about 15 to 20 francs annually (\$2.80 to \$3.80); in case of poverty the payment is made by the commune; in addition the Federal Government and the cantons contribute together about half of this amount.

The purpose of the insurance is to provide medical attendance and medi-

cines in case of illness or accident; also when necessary special kinds of treatment, such as ultraviolet-ray, X-ray, or orthopedic. Undernourished children and those in need of recuperation or rest are sent to special resorts in the country or in the mountains. Parents or guardians failing to insure their children or wards are subject to penalties.

The number of insured children increased from 25,000 in 1914, when the social insurance law of 1911 went into effect, to 338,000 in 1932. According to recent reports from Switzerland, the system of children's insurance has been working well. The expected reserves have been accumulated; large numbers of children have been sent to rest homes; and the sick children have been supplied with all the necessary treatment.—*Le Assicurazioni Sociali*, Rome, vol. 10, No. 1, 1934.

Epidemiological Studies on Relapsing Fever in California*

HARLIN L. WYNNIS, M.D., AND M. DORTHY BECK

Chief, Bureau of Epidemiology, and Junior Epidemiologist, State Department of Public Health, San Francisco, Calif.

RELAPSING fever is an acute infectious disease characterized by attacks of fever followed by remissions during which the patient feels quite well, only to be seized again by relapses. The onset is generally acute, with chills, high fever, intense frontal headache, and excruciating pains in the back, limbs, and joints. Nausea and vomiting may occur and prostration is marked. The attack lasts from 2 to 4 days and is usually terminated by crisis, the temperature falling rapidly to normal with profuse sweating, and within a few hours there is an apparent restoration to health. The afebrile periods last from 3 to 12 days. Without specific treatment there are generally 2 to 4 attacks, occasionally as many as 8, each of decreasing severity. One injection of neoarsphenamine is considered sufficient to effect a complete cure. In California the disease may be confused with influenza and malaria. However, there is a leucocytosis in relapsing fever and quinine has no effect on the course of the disease.

Relapsing fever is caused by *Treponema recurrentis*. This organism is a long slender flexible spiral filament, tapering at both ends. It is 10-20 microns long and usually has about 8

undulations, occasionally as many as 10 or 12. Long chains are sometimes observed, being arranged end to end. It is actively motile. The laboratory diagnosis of relapsing fever is either by blood smears or animal inoculation. The blood smears may be stained by the methods of Wright, Giemsa, or gentian violet. These methods are satisfactory during the febrile period when the organisms are usually found in abundance, but during remissions or at other times when they cannot be demonstrated by stains it is necessary to resort to animal inoculation. The patient's blood may be immediately inoculated into white mice or may be shipped as clotted blood to the laboratory. Our observations show that the spirochetes remain viable un-iced for as long as 6 days.

In the California group of cases there have been no serious complications or sequelae and no deaths. This is in contrast to the epidemic louse-borne type seen in the Old World where the mortality may be as high as 50 per cent or more.

While the disease is very common in various parts of the world and often reaches epidemic proportions, there have been relatively few cases in the United States. In 1844¹ the first cases were reported in Philadelphia, and for a number of years the disease appeared in Eastern United States, where the last epidemic was reported in 1869.

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

TABLE I
RELAPSING FEVER IN CALIFORNIA
CASES BY YEARS

Year	Number of Cases
1921	2
1923	1
1925	1
1927	2
1928	1
1930	4
1931	12
1932	16
1933	19
1934 (to Aug. 18)	11
Total	69

In 1875, Dr. P. B. M. Miller gave an account in the *Pacific Medical and Surgical Journal*² of an epidemic of relapsing fever among Chinese laborers at Oroville, Calif. This prevailed during the months of August, September, and October, 1874, and it was estimated that there were several hundred cases. No further mention is made in the literature of this disease in California until 1906, when 2 deaths were recorded

in the *19th Biennial Report* of the State Board of Health³ and in 1907, 1 death was reported in the *20th Biennial Report*.⁴ There is no comment on these deaths as to the geographic distribution or laboratory diagnosis.

The first proved cases were described by Dr. LeRoy Briggs⁵ of San Francisco, in 1921. These patients were infected at Polaris, near Lake Tahoe. They were proved positive by blood smear examination. Reports of one or two cases yearly are on record in the files up to 1930, when 4 were brought to the notice of the California State Department of Public Health. In July, 1931, the State Board of Health, recognizing the public health importance of the disease, passed a resolution making it reportable and to date (August 18, 1934), 69 cases have been recorded.

In Table I the group of cases shows twice as many males as females, which is comparable to the incidence in the Old World. There, the variation is attributed to differences in chances of ex-

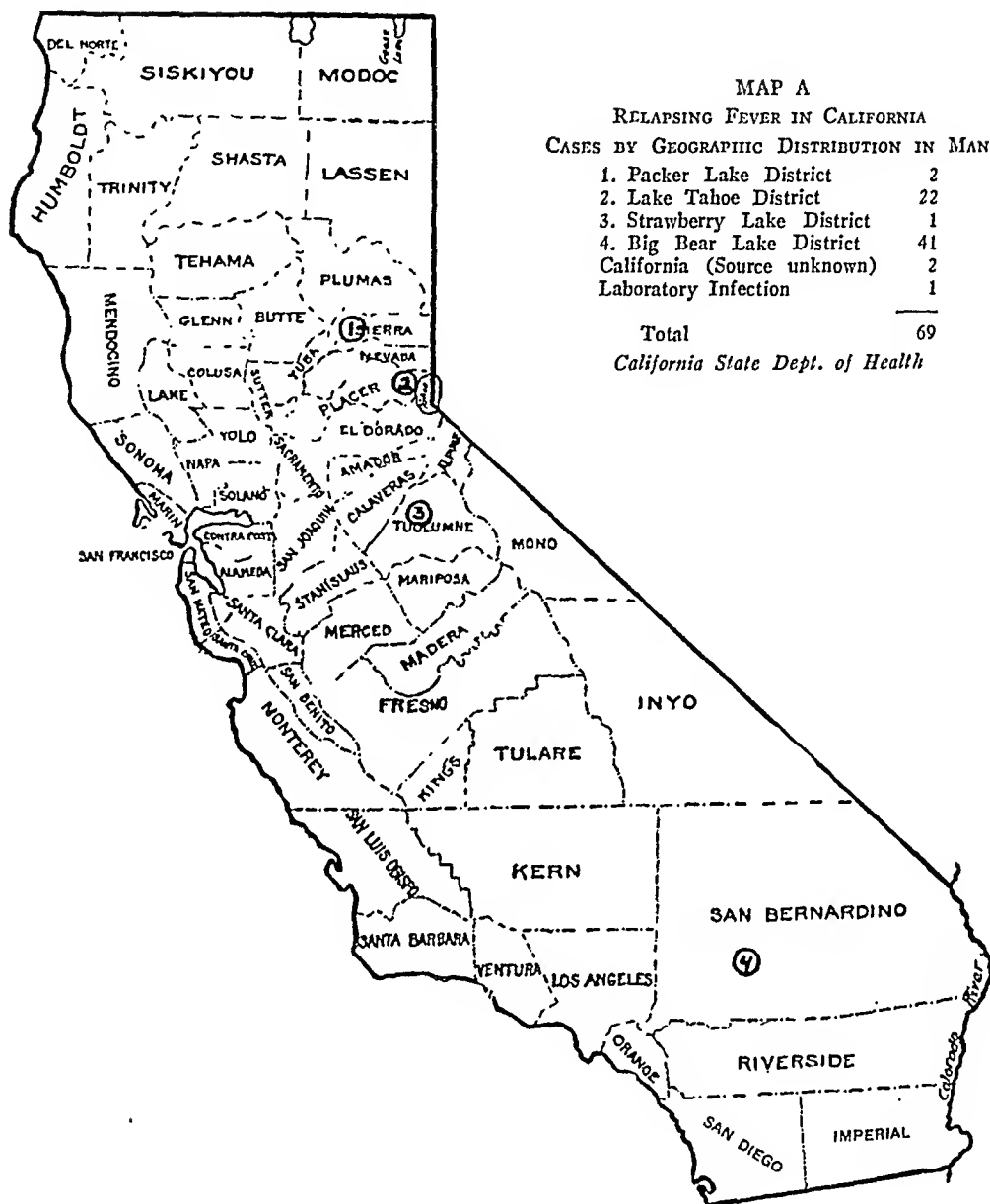
TABLE II
RELAPSING FEVER IN CALIFORNIA
CASES BY MONTHS OF ONSET

Month	Year										Total
	1921	1923	1925	1927	1928	1930	1931	1932	1933	1934	
January
February	1*	1†	..	2
March
April	1‡	..	..	1
May	1	1
June	2	..	..	1	1	..	1	3	6	2	16
July	3	9	5	6	6	29
August	2	5	6	2	15
September	1	1	..	..	1	..	1	..	..	4
October
November
December
Unknown	1	..	..	..	..	..	..	1
Total	2	1	1	2	1	4	12	16	19	11	69

* Owner of fox farm. Pelting done in February

† No laboratory confirmation

‡ Laboratory infection



posure but in our series of cases no such explanation is plausible. All ages from 4 years to above 55 are represented.

According to dates of onset the majority of cases occur in June, July, and August. This is also true in Texas, as contrasted with the epidemic louse-borne form which is more prevalent in the winter months. The occurrence of cases runs practically parallel with the appearance and disappearance of rodents. Table II shows the cases by years and months of onset. Two cases

are recorded in February. One of these patients owned a fox farm. The animals are pelted in February and during the process the operator receives many scratches and cuts. It is possible the infection was passed by direct transmission from these foxes. This was not proved, as blood was not obtained from these animals at the time of pelting. The second case reported in February was not confirmed by laboratory methods and is open to question. The April case was contracted through a

laboratory accident. One case had its onset in May, 1934, but this year the season was far more advanced than normal which may account for this.

The geographical distribution of human cases is of decided epidemiological interest (see Map A). Sixty-six of the cases recorded have occurred in 4 foci of the state: Lake Tahoe, Packer Lake, Strawberry Lake, and Big Bear Lake. These districts, as may be noted on the map, are in widely separated mountainous sections at elevations of 5,000 feet and over. The topography in all is similar. The mountains are heavily wooded and abound in animal life. The winters are rather severe with heavy snowfall usually lasting until late May or early June, while the summers are warm and pleasant, which makes these districts popular as resorts. Many wealthy people have summer homes around the lakes. The dates of onset of recorded cases correspond roughly to this seasonal change, to the return of animal and insect life, and to the sudden increase in population due to the influx of those on vacation. There is considerable evidence that the disease has long been established and is prevalent in these areas, as the natives speak of "squirrel fever" which is undoubtedly relapsing fever.

The possibility of an animal reservoir of *Treponema recurrentis* presented it-

self. Surveys were made in 3 of the foci: Big Bear Lake, Lake Tahoe, and Packer Lake in an attempt to determine the animal reservoir and the agent that may transmit the disease (Map B). The field work was started in the spring as soon as weather conditions permitted and the rodents were present in sufficient numbers. A mobile laboratory unit was used. Table III gives a summary of the rodents examined. Included under "other animals" were tree squirrels, Oregon fuzz-tail squirrels, rabbits, rats, mice, fitch, fox, woodchuck, weazels, bats, and birds. A total of 905 animals were examined for the presence of *Treponema recurrentis* in the two surveys 1931 and 1932. In the 1932 survey, 13 strains of spirochetes were isolated from these rodents⁷; 2 strains from tamarack squirrels; and 11 from chipmunks. The same species of rodents were found to harbor spirochetes in the 3 foci investigated.

A comparative study was made of the rodent and human strains to determine if they were identical. Morphologically the organisms from both sources appear to be the same. The field incident in which there appeared to be direct transmission of spirochetes from a tamarack squirrel to a member of the survey crew offers further proof that the two strains, animal and human, are identical.^{6, 7} Mr. X accidentally contaminated an open

TABLE III
RELAPSING FEVER IN CALIFORNIA
RODENT SURVEY

Animal	Big Bear		Lake Tahoe		Packer Lake		Total
	1931	1932	1931	1932	1931	1932	
Chipmunk	44	134	66	151	17	21	433
Golden Mantled Ground Squirrel	29	17	51	109	1	10	217
Ground Squirrel	27	13	47	64	5	3	159
Tamarack Squirrel . . . . .	..	..	9	8	16	6	33
Other Animals	3	32	15	3	2	8	63
Total	103	196	188	335	35	48	905

wound on his hand with blood from a squirrel recently shot, which later was proved positive for spirochetes. Seven days later he developed a clinical case of relapsing fever and similar spirochetes were demonstrated in his blood. Experimental work now in progress in this department, which will be reported later, seems to support the evidence that the spirochetes found in tamarack squirrels and chipmunks are identical with those found in patients associated with them, and that these rodents act

as a reservoir of infection for relapsing fever in California.

Nicolle and Anderson⁸ as a result of their extensive observations on relapsing fever in Tunis have developed the interesting hypothesis that blood spirochetes were originally parasites of small burrowing mammals and that rodents commonly serve as animal reservoirs of the disease. This is comparable to our observations, *i.e.*, positive findings in chipmunks and tamarack squirrels.⁷ The disease is transmitted



through the agency of ectoparasites such as various species of *Ornithodoros* according to the above authors. Clark, Dunn, and Benavides⁹ also suggest that relapsing fever is primarily a disease of animals and that man is only an accidental host—probably attacked by ticks as a matter of necessity.

In Texas, relapsing fever is transmitted by *Ornithodoros turicata*¹⁰ and in Panama by *O. talaje* and *O. venezuelensis*.¹¹ This means of transmission seems to be the most likely in California because of the following facts: (1) the endemicity of the disease, (2) seasonal distribution (3) class of people affected and their living conditions, (4) geographic distribution. The case histories were studied for reports of insect bites. Of the 69 patients 24 reported bites of some description caused by ticks, mosquitoes, fleas, and possibly bed bugs and other insects. In only a few instances could ticks be definitely incriminated. This may be because: (1) the larval and nymphal stages of these ticks are responsible for the transmission; (2) these forms are small in size, having been compared with the seeds of a strawberry; (3) ticks of species *Ornithodoros* do not remain attached after completing a blood meal; (4) after feeding, these ticks conceal themselves and hibernate, perhaps for months, therefore would be most difficult to find. A series of 5 cases reported in British Columbia¹² gave no history of insect bites, which might indicate that the problem there is similar to ours. As part of the epidemiological study in this state all the animals surveyed were examined for ectoparasites, with negative results except for fleas and lice. The burrows and nests of rodents were searched for ticks as were also the homes of patients. At Lake Tahoe nymphal forms of *O. turicata* were discovered in a cabin where a case had developed, and, associated with a number of cases, nymphal

forms of *Ornithodoros* (identification not completed) were found at Big Bear Lake. *O. coriaceus* was also found at Lake Tahoe. These specimens, however, were so limited in number that very little experimental work could be accomplished, and definite proof that these ticks are infected in nature is lacking in this state.

The California situation seems to be directly opposed to the epidemiological findings in Texas and Tropical America, in both of which places ticks of the species *Ornithodoros* are very prevalent; the native huts in Panama often yielding large numbers (4,880 specimens from 68 huts)^{11, 13} and certain caves in Denton County, Tex.,¹⁰ have supplied ticks in abundance. In California, the ticks are found with great difficulty and never in large numbers. If ticks were as numerous in California as in Panama and Texas, more cases would undoubtedly be reported because of the high incidence of infection found among wild rodents (chipmunks and tamarack squirrels). All indications in California are that the ticks hibernate during the winter with these rodents and become infected from feeding on their hosts, and are disseminated in the spring at the time the rodents become active and leave their nests.

Altitude seems to play a very important part in California, as the cases have been confined to mountainous districts over 5,000 feet in elevation. There is apparently no such limitation to the incidence of the disease in Panama and Texas. The actual elevation, however, is of less significance than the climatic factors present in these particular locations. The wild rodents, chipmunks and tamarack squirrels, in which spirochetes resembling *Treponema recurrentis* have been found are limited to these higher altitudes also, which is strong evidence that they act as the animal reservoir of relapsing fever in this state. On the other hand, the

species of ticks incriminated is probably not limited to the high altitudes. So, in explanation of the peculiar distribution of endemic foci in our state the suggestion is offered that it is determined by the animal reservoir rather than by the transmitting agent.

SUMMARY

1. Relapsing fever has been reported in California since 1874.

2. It is endemic in this state, 69 definite cases having been reported from 1921 to August 18, 1934.

3. Seasonal distribution is marked—the majority of cases occurring in June, July, and August.

4. Sixty-six of the 69 cases have been reported from 4 foci; 2 of the remaining 3 were of unknown source and the third was a laboratory infection.

5. The 4 foci are all mountainous districts over 5,000 feet in elevation and popular as summer resorts.

6. The same wild rodents (chipmunks and tamarack squirrels) have been found to harbor spirochetes resembling *Treponema recurrentis* in 3 of these foci. They probably act as the reservoirs of infection.

7. No definite vector has been determined. Ticks of the species *Ornithodoros* have been obtained at Big Bear Lake and at Lake Tahoe associated with proved cases of relapsing fever.

REFERENCES

1. Tice. *Practice of Medicine*, Vol. IV.
2. Miller, P. B. M. *Pacific Med. & Surg. J.*, Jan., 1875, pp. 370-375.
3. *Nineteenth Biennial Report of the State Board of Health of California*, Fiscal Years July 1, 1904, to June 30, 1906, p. 102.
4. *Twentieth Biennial Report of the State Board of Health of California*, Fiscal Years July 1, 1906, to June 30, 1908, p. 176.
5. Briggs, L. H. Relapsing Fever in California. *J.A.M.A.*, 79, 12:941-944, 1922.
6. Legge, Robert T. *California & Western Med.*, 38, 5 (May), 1933.
7. Porter, Beck, Stevens. *A.J.P.H.*, 22, 11 (Nov.), 1932.
8. Quoted by Hindle, Edward. *A System of Bacteriology*, Vol. 8, Medical Research Council, Chapter VI, pp. 146-181.
9. Clark, Dunn, and Benavides. *Am. J. Trop. Med.*, 11:243-257 (July), 1931.
10. Graham, M. *Texas State J. Med.*, 27:226-228 (July), 1931.
11. Dunn, L. H. *J. Parasitol.*, 13:249-255 (June), 1927.
12. Palmer and Crawford. *Canad. M. A. J.*, 28: 643-647 (June), 1933.
13. Dunn and Clark. *Am. J. Trop. Med.*, 13: 201-209 (Mar.), 1933.

Test for Protective Power Against Yellow Fever

A METHOD of testing sera for protective power against yellow fever is described and designated as the intraperitoneal protection test in mice. The test consists essentially of the inoculation of mice intraperitoneally with yellow fever virus, fixed for mice, together with the serum to be tested, and the simultaneous injection of starch solution into the brain to localize the virus. If the serum lacks protective power the mice die of yellow fever encephalitis.

The test is highly sensitive. Consequently it is useful in epidemiological studies to determine whether individuals have ever had yellow fever and in tests to find whether vaccinated persons or

animals have in reality been immunized. When mice were given large intraperitoneal injections of yellow fever virus fixed for mice, the virus could be recovered from the blood for 4 days although encephalitis did not occur. If the brain was mildly injured at the time of the intraperitoneal injection, the symptoms of yellow fever encephalitis appeared 6 days later, but the virus was then absent from the blood. Strains of white mice vary greatly in their susceptibility to yellow fever. W. A. Sawyer and Wray Lloyd. *The Use of Mice in Tests of Immunity Against Yellow Fever. J. Exper. Med.*, 54:533 (Oct.), 1931. Abstract in *J. A. M. A.*, 104, 4:275 (Jan. 26), 1935.

Hydrocyanic Acid Gas and Other Toxic Gases in Commercial Fumigation*

AIMÉ COUSINEAU, F.A.P.H.A., AND F. G. LEGG, F.A.P.H.A.

Sanitary Engineer, Department of Health, Montreal, Canada; and Sanitary Engineer, Department of Health, Detroit, Mich.

THIS joint paper summarizes the study made by officials of Detroit and Montreal, working independently, on behalf of their respective health departments, to draw up safe and practical fumigation regulations for the effective destruction or control of vermin.

Fumigation is a process of sanitary significance, in which a lethal gas is confined in an enclosed space, to destroy insect life in all stages and rodents.

GENERAL CONSIDERATIONS

Theoretical considerations related to the subject of fumigation, such as the laws of gaseous diffusion, the penetrating power, and the stratification of gases, etc., will be referred to but will not be discussed. In this respect, sanitarians must depend upon the available scientific data, although heterogeneous in nature, based on fundamental principles, but which must be interpreted and applied, to the view of safeguarding human lives.

The conditions of fumigation, save for climatic differences or variations, are relatively the same in all cities; but no standardized regulations are yet existent in the United States and Canada.

Because this material is not available, much study is required to correlate the useful information on the subject, especially that on warning gases, which has been the subject of considerable controversy in the past few years. In a study of this nature, it is logical to include the fumigants under consideration among the known noxious gases, and, to this end, no better classification is available than that given by Henderson and Haggard¹ who have placed cyanide gases used in commercial fumigation among the group of asphyxiants, the latter group being subdivided into "simple asphyxiants," or physiologically inert gases, like nitrogen and hydrogen; and "chemical asphyxiants," or substances which, by combining with the hemoglobin of the blood, stop oxidation in the living tissues, so that the oxygen cannot be utilized and death from asphyxia soon occurs.

Hydrocyanic acid gas (HCN), and cyanogen gas (C₂N₂), being in the class of "chemical asphyxiants," must be handled with great care by competent operators, and according to well established procedure.

Every city of any importance must, sooner or later, in the interest of safety, enact ordinances or regulations to prevent unnecessary fatalities which are due mainly to ignorance or negligence in conducting fumigation operations.

Experience of the past 25 years has

* Read before the Public Health Engineering Section of the American Public Health Association, at its Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

demonstrated the effectiveness of various toxic gases, when employed as fumigants for the extermination or control of pests common to certain classes of industry, and those classed as "household pests," the presence of which is extremely annoying to human beings. Governmental agencies have, from time to time, published bulletins for general distribution in which the recommended methods for the control of various insects, rodents, and pests have been explained in great detail. Poisons, spray compounds, gases of varying toxicities, powders (poisonous and non-poisonous) are the recommended vehicles by which the vermin are eliminated. The information contained in these bulletins has been a great boon to mankind in that it has supplied individuals with the knowledge necessary for the solution of their particular problems. On the other hand, it has stimulated the use of toxic gases, the employment of which is accompanied by greater hazards than the layman understands. Experience has indicated that the promiscuous use of this knowledge has resulted in a loss of life sufficient to prompt official cognizance of fumigation hazards with the enactment of legislation designed to insure greater safety to the public.

We believe that of all the toxic gases employed for exterminating purposes, hydrocyanic acid gas (HCN) is conceded to be the most dangerous. Its deadly character, coupled with the fact that its slight characteristic odor is not detected by the average person, renders any error in the technic of its use extremely hazardous.

Any attempt to discourage the use of a gas that has become more or less the standard for exterminating purposes, on the grounds that there are less hazardous methods of accomplishing results, has met with a great deal of opposition. In the first place, there appears to be a difference of opinion among the better

informed as to the necessity for restricting the use of straight HCN, other than to require that its use be subjected to control by licensing operators and its application subjected to strict regulations governing technic.

Detroit was one of the first cities which attempted to control the use of toxic gases in exterminating practices. The first ordinance was enacted in July, 1921. This legislation has been amended several times in an effort to decrease the deaths and accidents attributed to the use of HCN. The regulations in effect for a number of years have embodied the standard requirements, such as: the examination of all persons as to their qualifications before licensing them to employ the gas; the filing of an approved \$1,000 indemnity bond; the reporting of every operation to the Department of Health; the complete vacating of the entire independent structure, any portion of which is subjected to the gas; the placarding and guarding of the structure during the period of gasing and ventilation; prohibiting children to reënter until the following morning; a minimum airing period of 2 hours or until all traces of the gas have disappeared and the structure is pronounced safe by the licensed fumigator.

In spite of these regulations, guards are unreliable and inefficient, and unsuspecting persons enter to their death. Persons disregard the caution to keep windows open and in closing them create potential death chambers.

Fifteen deaths have occurred in Detroit since 1921, and in Montreal 8 recorded deaths since 1928, all of which have been positively attributed to HCN in fumigations. During this period it is estimated from available records that no less than 30,000 separate jobs were undertaken in Detroit in which this gas was employed. One death per 2,000 fumigations performed, the approximate average for Detroit, would probably

represent the normal accident expectancy in any community.

The circumstances under which the deaths occurred indicate that negligence of some degree was a contributing factor in every case. There are so many things that may happen on a given fumigating job to create a potential hazard that it is not possible to predict the ones most likely to occur.

If regulations and rules of conduct are made too rigid, there will be no fumigations performed with HCN except those undertaken surreptitiously. This statement is based upon the fact that in the last analysis the cost of exterminating in a given case will determine the method to be employed, provided, the property owner or manager is convinced that the particular method used is to be effective.

Under similar rules of procedure an operator employing cyanogen chloride (CNCI) in fumigation cannot compete with one employing straight HCN on account of the difference in cost of the ingredients, inconvenience in handling, and greater care necessary in sealing the spaces to be fumigated. Straight HCN released by the pot method is without doubt the cheapest, most effective method of exterminating certain household pests.

To contend, as do some exterminators, that there are no other reliable methods available to accomplish comparable results is unwarranted; yet, such assertions have been made before legislative bodies by interests opposed to any interference with the practice of releasing straight HCN for exterminating purposes.

It may be a fact that there are no other methods as effective at the same unit of cost, but, on the other hand, there are no other methods that constitute an equal hazard to human life. The question which is to be settled is, therefore, one of cost as balanced against safety.

Those engaged in the business of exterminating and who employ HCN as the principal fumigant, placing very little reliance on sprays and powders for the effectiveness of their operations, are very anxious to have all persons engaged in exterminating licensed for the purpose of control. It is alleged that the method which they employ are sufficiently hazardous to warrant supervision.

Granted that there is the possibility that roach powders may be so carelessly spread as to poison food or be eaten by infants or small children and that various sprays may create a fire hazard, the Detroit experiences over a period of 13 years have not been such as to place the spreading of insecticides, the use of pyrethrum sprays, or the burning of sulphur in the same category *with the use of HCN*.

The U. S. Public Health Service, under whose jurisdiction ship fumigation is conducted, has experimented with various gases, and from information obtained from the Bureau it is apparent that the authorities are of the opinion that the so-called warning gases are desirable. However, the greatest degree of protection to the public as regards the use of lethal gases for domestic fumigation is, they believe, afforded through the adequate control of the concerns and employees engaged in the business, the products to be used, and the premises in which they are used.

From an analysis of the accidents in Detroit and Montreal over a period of several years, from close observation of the actual effectiveness of CNCI combination with HCN as a practical warning in fumigation, the Detroit and Montreal health authorities have concluded, and are on records, that the use of straight HCN in the fumigation of dwellings for exterminating purposes, should be prohibited, and that lethal gases employed in fumigation be mixed with an approved warning expulsive gas,

or be of themselves warning expulsive gases.

An ordinance in line with this policy was recommended to the Detroit Common Council in July, 1933. To date, objections on the part of commercial fumigators and chemical manufacturers, together with the conflicting opinions of authorities as to the value of warning agents in fumigation, have succeeded in delaying legislative action recommended as a safety measure by the Detroit Board of Health.

Public opinion showed alarm in Montreal over this same matter, during the past few years, and proper legislation was sought. To the Health Department of this city was entrusted the task of preparing and enforcing ordinances, based on the best available scientific information and on the existing legislation.² This has brought up important considerations regarding the basic principles of the subject of fumigation, especially of warning gases. It is now hoped that a consensus of opinion on the latter will soon be reached—first, as regards their necessity; second, as regards the relative value of those gases which are in most common use; third, as regards the results obtained in safeguarding human life, with or without the use of warning gases.

STANDARDIZATION

Along the line of standardization of fumigation ordinances, good work has been accomplished by the National Fire Protection Association,³ and reports have been made at their 1933 and 1934 meetings, held in Milwaukee and Atlantic City respectively. The above regulations which pertain mainly to fumigation hazards, do not contain any reference in regard to the use of warning gases.

This omission may be attributed to the fact that these regulations were drafted with the main view, that fumigation processes introduce fire hazards, as

illustrated in Factory Mutual Data sheet 11-91-31:

Nearly every fumigation process introduces a serious fire hazard, either because the fumigant is flammable and creates an explosive atmosphere or because it is extremely toxic and curtails or prevents effective fire fighting.

The same divergence of opinion exists in regard to the subject of cross-connections in water supplies. Sanitarians require their complete severance, while, for safety purposes, fire protection associations are inclined to permit their use under certain conditions.

The Bureau of the U. S. Public Health Service may take a stand in the near future in reference to the use of warning gases in the fumigation of inhabited buildings, which stand would lead, no doubt, to the standardization of fumigation ordinances.

Provisions have been made in the Montreal fumigation by-law,⁴ to meet such eventual developments; the proposed Detroit new regulations have also included these necessary provisions.

MONTREAL FUMIGATION ORDINANCE

In the Montreal enacted ordinance, "fumigant" is construed to mean, not only "hydrocyanic acid in any form whatsoever," but as well, "any other substance as may be specified by the Director of the Health Department."

Moreover, the use of "fumigants" derived from hydrocyanic acid or its compounds is prohibited in inhabited buildings, unless they are associated with a warning gas, such as cyanogen chloride in the proportion of at least 30 per cent. Warning gases other than cyanogen chloride with their relative proportions to the fumigant used, may, however, be approved by the same authority, provided they give, in "non-dangerous concentrations, a sufficient and non-equivocal warning and render the stay unbearable in the dangerous zone, etc."

DETROIT FUMIGATION ORDINANCE

The Detroit proposed new fumigation ordinance which is being considered by the authorities of the city, contains the following provision in regard to warning gases which has been proposed, after the U. S. Public Health Service has given the assurance that it will co-operate with health departments in the approval of such gases:

The use of poisonous gases, fumes or vapors in fumigation is hereby prohibited, unless the same are mixed with a warning expulsive gas, or are in themselves warning expulsive gases. Such gas, gases, fumes or vapors or combination thereof, shall be such that the Department of Health of the City of Detroit and the United States Public Health Service approve them as giving sufficient warning to human beings in less than dangerous concentrations, as to create sufficient discomfort to have a definite expulsive effect, etc.

According to H. J. Langhorst, fumigation expert, ideal warning gases are those which have relatively the same specific gravity, vapor density, and penetrating power as HCN. Mr. Langhorst admits at the same time, that such gases are not to be found, but much to be desired.⁵

Warning gases are much heavier than air while HCN is slightly lighter than air; HCN diffuses 1.5 times as rapidly as CNCl, and twice as rapidly as chloropicrin. Warning gases have lower penetrating power and may be aired out before HCN has been completely liberated, and hence it is thought that the post-warning effect is not reliable. It would appear, however, according to Williams⁶ that such gases may be of value in preventing accidents in those cases where the fumigant gas has passed through unsuspected openings, from one building to another, and, without doubt, where unwarned persons are entering into premises under fumigation.

We fully realize that the warning gases now being used are not entirely reliable, but we are inclined to believe that the objections to their use are not

serious enough to outweigh the advantage of such a practice provided, however, that all the known precautions are taken as well.

As to the relative value of warning gases in commercial fumigation, it is only necessary to consider the case of CNCl and of chloropicrin, as all the other warning gases have not proved so reliable, because of their too great difference in molecular weights as compared with HCN.

The molecular weight of chloropicrin compared to HCN is so different that it cannot constitute a satisfactory warning gas; its characteristics are such that complete separation of the gases may follow as soon as liberated. Moreover, the tear effect remains after the room or compartment has been cleared of HCN and prolongs the clearing out of fumigated rooms when mixtures of above 5 per cent chloropicrin are being used. Nevertheless, the above disadvantage may not outweigh in industrial or ship fumigation the practical advantage gained with the use of simple means or improved methods.

CHLOROPICRIN

Due to their commercial availability other forms of HCN, Zyklon B, HCN Discoids, Cyanogas (calcium cyanide), and liquid HCN, with 5 per cent chloropicrin, have replaced to a certain extent cumbersome generative methods in ship fumigation.

It is to be noted that the problem of house fumigation differs widely as to hazards involved, compared with ship fumigation performed under the supervision of medical officers and a specially trained personnel which has undergone a course of instruction, followed by practical and theoretical tests on the use of lethal gases. Moreover, the danger zone in ship fumigation, is limited to its enclosed space, and the strict ship discipline contributes largely also to the elimination of fumigation hazards.

HCN-CNCL MIXTURE

Although the above methods and fumigants may also be convenient in household fumigation, they do not offer sufficient guarantee for safety and health, as the tear or lachrimating elements contained in these products do not give positive warning.

The cyanogen-chloride mixture, on the other hand, has been found to give positive warning, even in sub-lethal concentrations, and possesses in addition nearly all the characteristics of HCN as a fumigant. The above mixture is not only an insecticide but a germicide as well.

As far back as 1923, an amendment (No. 6) to the U. S. Quarantine Regulations, Public Health Service, was authorized, and since then the cyanogen chloride mixture was added to the list of permitted gaseous agents.

Suffice to cite here part of paragraph 179A, contained in the amendment:

Cyanogen chloride mixture when used in concentrations, for the length of exposure recommended in these regulations, and by experienced fumigators who avail themselves of the safeguards furnished, is not believed to be attended with any greater hazard than the use of sulphur dioxide.

As to the separation of the constituents of the HCN-CNCL mixture, under ordinary conditions of use, we may quote the following authorities:

Pease: The gas generated at any one time is a mixture of the two gases in the same sense that air is a mixture of (essentially) two gases, oxygen and nitrogen, and that there would be no possibility of any separation taking place under ordinary conditions of use.⁷

Stead: HCN and CNCL may be generated on the premises by adding sodium cyanide and sodium chlorate to HCL in the proper proportion.—The final product is $\frac{1}{3}$ HCN and $\frac{2}{3}$ CNCL by weight, presumably tied together with a chemical bond.⁸

Frazer: If HCN and CNCL are left for a sufficiently long time to reach equilibrium by diffusion, it will be impossible for them to separate or change concentrations, except as they may diffuse from the hold and escape, and here again the same factors will govern,

the lighter gas diffuses more rapidly than the heavier.⁹

Finally as to the relative value of the two warning gases in most common use, CNCL and chloropicrin, it may be of interest to quote here the following extract from a report, prepared by Williams, Hosendorf, and Redlon of the U. S. Public Health Service, on the Fumigation of Vessels:

Both of the warning gases which have been used with liquid cyanide produce a tear effect. The effect of the 20 per cent cyanogen-chloride gas is greater than that of 5 per cent chloropicrin, *i.e.*, lachrimation is much more marked; and it is believed that, on account of the tear effect, a person unfamiliar with fumigation could escape from a small room containing hydrocyanic-acid gas with 20 per cent cyanogen chloride before inhaling a dangerous amount of cyanide.

The lachrimation which is produced by 5 per cent chloropicrin is much less, and even when used by experienced fumigators it would seem desirable to have a more pronounced warning effect, etc.¹⁰

In an endeavor to complete our information with the aid of the available data on the subject of fumigation, and on warning gases, in particular, we have obtained various other personal opinions from officers and former officers of the U. S. Public Health Service of which we will take the liberty of summarizing a few:

1. *Cumming:* It is the consensus of opinion of the officials of the United States Public Health Service who have given consideration to this matter, that a warning property in a fumigant is of distinct advantage in the prevention of accidents. It is realized that the gas added to hydrocyanic acid at the present time to give the resulting fumigant a warning property, does not have all the characteristics needed; however, until a satisfactory agent is developed it should be used.¹¹

2. *Cumming:* It is the consensus of opinion of officers of the Public Health Service that the use of straight hydrocyanic acid gas for fumigation of buildings or other enclosures should be prohibited. . . . In answer to your question as to the warning agent referred to in my previous letter, this gas was chloropicrin: however, this will apply similarly to cyanogen chloride. Patents on

the use of this latter have been assigned to the Treasury Department and held by the Public Health Service.¹²

3. *Cumming*: It is to be observed that all of the warning gases at present in common use (cyanogen chloride, chloropicrin) are approximately twice as heavy as hydrocyanic acid and under some conditions separate from a mixture of the two gases. Usually this occurs where the gas mixture penetrates further and more rapidly than the warning component. . . . The question of requiring the mandatory use of a warning gas in connection with the application for fumigation purposes of a lethal gas is quite involved and cannot be met simply.¹³

4. *Creel*: Judging from my experience of the last 20 years, I should say by all means, that any laws or regulations governing commercial fumigation of buildings in any city, should provide for automatic safeguards, such as a lachrimating element in all fumigating gas.

HCN-CNCl mixture was first used at San Francisco Quarantine the fall of 1922, and for the 4 years I was at the station fumigating an average of 600 vessels a year, there were no accidents whatsoever, nor so far as I know have accidents ever occurred aboard ships where CNCl was employed.¹⁴

5. *White*: Regarding my personal opinion as to the fumigants, I may state that I consider cyanogen chloride mixture, containing at least 35 per cent warning gas, as the only safe and fool-proof gas in use today. I have never learned of any accident from the use of it on ships.¹⁵

6. *Houghton*: Judging from our experience of the past 5 years, we have retailed 50,000 units of our Safri-Fume (HCl-CNCl mixture), without one case of an accident being recorded.¹⁶

In accordance with the carefully considered policy of the Health Department of the City of Boston where the above fumigants have been mainly used, no attempt to regulate fumigating has ever been made.

STUDY OF AVAILABLE DATA PREVIOUS TO THE PREPARATION OF FUMIGATING ORDINANCES

Following a careful study of all available data, the Montreal fumigation regulations have been drafted, above all, in the interest of safety and public health, regardless of the commercial

availability or serviceability of marketed products.

In a general way, the regulations are written in the by-law, but discretionary power is given, in certain cases, to the Director of the Health Department.

The Montreal ordinance dealing with the question of lethal gases, being the most recent piece of legislation on this subject, covers every possible contingency. It includes 41 articles, grouped in 5 chapters, referring to definitions or interpretation of the terms used, certificate of competency, permits and licenses, materials and mode of proceeding; enforcement, and finally, to penalties for contravening any of its provisions.

Among the interpretative clauses which are of interest to cite here are those relating to "fumigant," "nuisance," "danger zone," and "vermin."

"*Fumigant*" is construed to mean hydrocyanic acid in any form whatsoever, or any other substance as may be specified by the Director of the Health Department generated in a building or supplied ready prepared as a liquid, or in a solid form, and which, by itself or in combination with other substances, emits or liberates a gas or gases, fumes, or vapors liable to cause a nuisance.

"*Nuisance*" means any act or omission which may endanger the life, safety, health, property, or comfort of the public of an individual or individuals, or by which the public or any individuals are obstructed in the exercise or enjoyment of any right common to all His Majesty's subjects.

The meaning of the word "fumigant" being well established and its use permitted only on the explicit condition that it will not cause a nuisance as defined above, the boundaries of the "danger zone" had to be extended not only to the rooms within the walls of building, from cellar or basement to the roof level, but in addition, the adjoining ground and any contiguous room in adjoining building, or to any building, the occupants of which are so exposed as to be subjected to a nuisance from fumigation.

Fumigation having for its object the destruction or control of "vermin," this term has been defined as "any insect and other animal pest found in or about a building, which attacks human beings, or domestic animals, or foodstuffs, or organic refuse, or clothing, or bedding, or furniture, etc., namely: flies, bed-bugs, fleas, lice, rats, mice, cock-roaches, ants, moths, worms, mosquitoes, spiders, crickets, bats, wasps, ticks, etc."

One of the most important phases of any fumigation ordinance, is that which refers to effective provisions for the qualification and responsibility of persons carrying on fumigation operations.

An examination is required to obtain a certificate of competency from a Board of Examiners, specially named to that effect, which consists of the necessary tests to ascertain the training, experience, and fitness of applicants for licenses, as well as their acquaintance with the provisions of the regulations in force, their knowledge of the methods of resuscitation, the toxic action of fumigants, etc., and finally, a medical certificate from every operator, showing that he is in good health.

Three types of licenses have been provided in the Montreal by-law which entitle the respective holders thereof to perform certain operations:

1. *Master-fumigator*: If duly qualified as fumigator, or having in his employ at least one operator qualified as such, to keep or operate a bona fide fumigation business.

2. *Fumigator*: To conduct fumigation operations for a master-fumigator.

3. *Journeyman-fumigator*: To work under the immediate supervision of a licensed fumigator.

The above licenses are granted by the Director of Finance only when a permit or a written authorization is obtained from the Health Department. A certificate of competency, as referred to above, is required to obtain a license. If issued to a master-fumigator, a real estate bond, or indemnity bond, or public liability insurance policy, in the sum

of not less than \$10,000, must be furnished to the city by the applicant for the benefit of any one who may suffer injury, etc.

Licenses may be refused or revoked. In case the licensee be convicted for a third time before the Recorder's Court, of any infraction of any provisions of the fumigation ordinance or, for the first time before a higher Court of criminal neglect, his license is *ipso facto* revoked and cannot be renewed.

It is explicitly stated in the by-law and fumigators are required to take notice, that licenses issued, etc., do not bind the city; or place upon it any liability in regard to the processes used or their application, and that the licensees alone must assume the entire liability, criminal or civil, to which they may be subject by reason of general laws, in case of death, personal injury, illness, or property damage by fire or otherwise.

The owners or occupants of commercial or industrial establishments, using fumigants on their own premises, or in connection with the material contained therein, are exempted from obtaining a license, but are required to obtain a certificate of competency; the employees of the Federal and Provincial Governments and of the city, in the performance of their regular duties, do not fall under the jurisdiction of the present regulations. Ship fumigation is controlled by the Quarantine Service of the Department of Pensions and National Health, and are, hence, outside the jurisdiction of the present regulations.

MATERIALS AND MODE OR PROCEEDING

Before fumigating any building in Montreal, the master-fumigator is required to give notice to the Health, Police, and Fire Departments, in the form of a written statement to the effect that he has obtained the authorization in writing of the proprietor and

of all responsible occupants of the buildings to be fumigated, and that he has warned all other responsible occupants of the premises situated within the dangerous zone, of the nature of the operations to be performed on the day and at the time designated.

No provisions have been made for the delivery of a permit to a master-fumigator, to perform fumigation in a specified building, and at a specified time, as no such permission can be given, unless the premises concerned are previously thoroughly inspected by city inspectors—this is left entirely to the licensees. Otherwise, a share of the responsibility in case of accidents or fatalities could be attributed to the enforcing authorities.

As stated above, the fumigators must assume the entire liability in regard to the processes used and the operations carried on, the notification procedure being required only to enable the city to ascertain whether the operators are offending against any of the enacted provisions.

The conditions under which the fumigation operations should be carried on need not be stressed, as they are similar in all ordinances and conform to established practice—sealing of rooms to confine the gas to the fumigated premises; warning signs; guards stationed around the building; removal of food; extinguishing of fires; opening of rooms after fumigation; beating or shaking of articles of bedding, ventilation before re-occupancy, and other operations usual in the practice of fumigation.

The operator should allow a sufficient period of time for ventilation purposes before re-occupancy; such period should not be less, however, than 3 hours, during which time, the temperature of the fumigated premises should be sufficiently high to assure the complete dispersion of gases; in cold weather, the fumigated premises should be thoroughly heated as part of the ventilation operation.

Hence, to prevent stratification of gases in the northern climate, when fumigations are performed on cold days, the temperature of the fumigated rooms should not be below certain limits; this precaution is considered essential, as is also the necessary increase in the period of ventilation on muggy and humid days in the other seasons of the year.

The period of ventilation stipulated above, has been fixed after a careful study and consideration of valuable information on this subject, especially from publications of the U. S. Public Health Service and the U. S. Department of Agriculture reports, etc.¹⁷

As a matter of precaution no fumigation should be performed unless atmospheric conditions are favorable.

No attempt has been made to regulate the class of materials to be employed in commercial or industrial establishments using special fumigation chambers or vaults nor solely in their own premises nor with reference to the material contained therein. The sale of fumigants to persons other than licensed fumigators, is, however, regulated. Moreover, a report of analysis, signed by a recognized chemist, of the substances used for fumigation is required; at any time, when deemed advisable, the Health Department may cause these substances to be analyzed at the expense of the master-fumigator.

The use of fumigants in inhabited buildings has been the main object of the enacted regulations. Although hydrocyanic acid in any form is the substance intended to be regulated, other substances as well emitting or liberating dangerous gas or gases, fumes or vapors, may be considered as a fumigant and in this connection the Director of the Health Department has discretionary power.

CONCLUSIONS

The above considerations represent our well considered opinion, as sani-

tarians, reached after a careful study of the available data and expert opinions on fumigation. We admit that the greatest danger in household fumigation operations lies in the non-regulation of these activities, but we recognize, as well, that HCN and its compounds are poisonous and can cause death in a very short time, if breathed in concentrations used in fumigation work. A certain number of deaths have been recorded in the last few years when straight HCN has been used. To guard the public against carelessness and even apathy, reasonable safety measures must be provided, such as warning elements, whenever HCN is used. Cyanogen chloride has been found to give non-equivocal warning of the presence of HCN, by rendering the stay unbearable in or about fumigated premises.

Moreover, no known serious accident can be attributed to the use of HCN-CNCl mixture, notwithstanding the scientifically sound, but disputed arguments, as to the separation of its chemical constituents, under certain conditions of use.

Industrial and ship fumigation, as well as fumigations in well constructed and operated vaults or chambers, do not introduce the same hazards, and for this reason important concessions can be made to the choice of materials and the application of methods recommended for such purposes.

A great deal of effort and time have been spent by sanitary officials of different cities and by the manufacturing chemists to devise means that will safeguard human life, but no consensus of opinion has yet been reached. The supreme arbiter in all matters related to public health and sanitation in America is, without doubt, the United States Public Health Service, and, it is a great satisfaction to know that this service is taking an active interest in this question.

REFERENCES

1. Hendcrson and Haggard. Noxious gases and the principles of respiration influencing their action. American Chemical Society. *Monograph Series No. 35*, pp. 96-112.
2. Quarantine Regulations of the United States Public Health Service; Quarantine Regulations of the Department of Pensions and National Health, Ottawa. Sanitary Code and Regulations governing the use of fumigant, exterminator or insecticide of the Department of Health, New York (adopted by the Board of Health, June 3, 1920, amended December 1, 1931). Amendment to Chapter XXV of Ordinances of City of Buffalo, adopted June 23, 1924. Ordinance No. 288B of the City of Detroit, approved June 27, 1921, and amended January 31, 1927, and draft of proposed new regulations (1934). Sections 2141(a) to 2141(g) of Article XXXIII, Chapter XXXIX of the Chicago Municipal Code of 1922 (approved November 12, 1929). No. 13015. A by-law to regulate the fumigation of buildings in the City of Toronto (passed, February 23, 1931). Revision of the Toronto by-law, effective November 11, 1933. Ordinance No. 495 of the City of Pittsburgh, on Fumigation (approved October 9, 1931). Proposed by-law for the City of Indianapolis (1932). Proposed ordinance for the City of Baltimore (1933). Fumigation with Cyanides (sections 294-5-6) City of Los Angeles, Calif. (11-20-30). Proposed Act on Fumigation of the State of Michigan (Senate Enrolled Act No. 68-1933). Regulations of the Department of Health, Ontario (June 9, 1931). Hydrocyanic acid gas an insecticide, Province of Manitoba (July 30, 1930), etc. Tentative draft of proposed law for the regulation of fumigation prepared by Dr. C. L. Williams (1933).
3. National Fire Protection Association: Fumigation hazards—Committee under the chairmanship of Eugene Arms, proposed a model fumigation ordinance of which the text has been approved at the 1934 meeting of the Association.
4. Montreal By-law No. 1275 concerning the use of fumigants for the destruction or control of vermin, adopted by the City Council of February 12, 1934. This By-law has been prepared by the Sanitary Engineer of the Department of Health, has been studied very carefully by a Committee of experts of the Quebec Safety League, under the chairmanship of Alex. R. White, Chief Sanitary Inspector of the Canadian National Railways; the other members were Colonel George Beauchamp, Medical Inspector of the Montreal Quarantine Station, Dr. Milton J. Hersey and Lucien Perrault, Chemists. Most of the suggestions offered by this Committee have been embodied in this by-law.
5. Langhorst, H. J. Insecticide Division of the American Cyanamid and Chemical Corporation (letter to the Chicago Public Health Department, January 11, 1933).
6. Williams, C. L. Surgeon of the United States Public Health Service. *Fumigants, Reprint No. 1473, Pub. Health Rep.*, 46, 18 (May 1), 1931.
7. Pease Laboratories, Inc., New York City—Report in the matter of summary on an investigation of Saffi Fumes briquettes, January 19, 1931 (Laboratory No. 252461).
8. Paper on Fumigation by Frank M. Stead of the Los Angeles County Health Department, March 1, 1932.
9. Frazer, J. C. W. Department of Chemistry. The Johns Hopkins University (Letter dated August 6, 1931, to B. O. Berry of the Safety Fumigant Co., New York City).
10. Williams, C. L., Holsendorf, B. E., and Redlon, J. R. "The Fumigation of Vessels." A symposium. *Reprint No. 1518, Pub. Health Rep.* (1931).

11. Cumming, H. S., Surgeon General, U.S.P.H.S. (Letter to Dr. Henry F. Vaughan, Commissioner of Health, Detroit, January 16, 1934.)

12. Cumming, H. S., Surgeon General, U.S.P.H.S. (Letter to Dr. Henry F. Vaughan, Commissioner of Health, Detroit, February 26, 1934.)

13. Cumming, H. S., Surgeon General, U.S.P.H.S. (Letter to Dr. Henry F. Vaughan, Commissioner of Health, Detroit, June 20, 1934.)

14. Creel, R. H., Medical Director in charge of the U. S. Marine Hospital, Baltimore (Letter dated January 30, 1933, to Aimé Cousineau).

15. White, H. F., Surgeon, U.S.P.H.S. Quarantine Station, Baltimore (Letter to Dr. H. Williams of the Baltimore Health Department, May 6, 1932).

16. Houghton, Harry W., President of the Safety Fumigant Co., Boston, Former Surgeon of the U.S.P.H.S. (Letter to Para Products Corp., Ltd., Montreal, December 15, 1933).

17. Williams, C. L. "Fumigants," *Pub. Health Rep.*, 46, 18 (May 1), 1931. *Farmers' Bull.*, 1670, U. S. Department of Agriculture.

OTHER REFERENCES

Gibson, Arthur, and Twinn, C. R. Household insects and their control. Department of Agriculture, Dominion of Canada.

Houghton, H. W. New method ship fumigation. (U.S.P.H.S. and Chemical Warfare Service), Aug. 3, 1922.

La Pratique de la Désinfection par les Drs. A. Besson et G. Ehringer (Librairie J. B. Ballière & Fils, Paris). Les gaz toxiques par L. Dautrebande, Professeur à la Faculté de Médecine de Liège (Masson & Cie. Editeurs, Paris).

Bocker, Edward, Chief Drug Inspection, New York Department of Health. Paper on warning gases in Cyanide Fumigation (*Soap*, 1933).

Publications of the American Cyanamid and Chemical Corporation and of The Safety Fumigant Co.

Brown, E. W. Carboxide: A New Fumigant for Red Bugs and Cock-roaches. *Nav. Med. Bull.*, 31: 253 (July), 1933.

Brown, E. W. Carboxide on Ships. *Nav. Med. Bull.*, 294-317 (July), 1934.

DISCUSSION

C. L. WILLIAMS, M.D.

Senior Surgeon, U. S. Public Health Service, New Orleans, La.

IN 1930, Dr. W. Deckert, of Hamburg, published an extensive paper on the legislative principles of the control of noxious animals by hydrocyanic acid as applied in most of the civilized countries. In this paper, Dr. Deckert endeavored to summarize fumigation control legislation as it then existed, and he cited a considerable list of laws, ordinances, edicts, proscriptions, letters of instruction, and other pronouncements. All through his paper he comments upon the confused picture presented by the continual and active change in fumigation regulations. So impressed was he by this active change that he found it necessary to tabulate control measures as they existed on a certain day, for this purpose selecting September 1, 1929.

The confusion of the picture can best be illustrated in his own words; for instance, where he says: "It appears strange when, as is sometimes the case, one country prescribes exactly what another forbids." As illustrations of this remark he cites that, in Denmark, fumigation of ships below decks is for-

bidden on account of difficulties in ventilation, whereas, in Spain, below decks may be fumigated and released after only 1 hour's ventilation, but rooms above decks must be ventilated for 8 hours. And again, in one American city, it is permissible to empty residue from fumigating crocks into the sewers, whereas, in Norway, it is prescribed that residues must be made innocuous chemically, and even then must not be poured into sewers but must be buried. Further, in Belgium, injections of camphor are prescribed as antidotes for HCN poisoning in cases of fumigation accidents, whereas, in England, the use of camphor is expressly forbidden.

So amazing and remarkable are the confusion and contradiction of directions concerning fumigation which appear throughout the paper that one with a sense of humor cannot read it without a constant smile, if not, indeed, without breaking into laughter, until, perhaps, he suddenly realizes that these variegated attempts to control as practised by the different countries of the world

are more or less exactly repeated by the equally variegated attempts put forth in the various states and in communities within the states in his own country.

It doubtless appears strange to start a discussion of one paper by discussing another, and that one of several years' standing. But, as a matter of fact, it is quite apropos. One of these papers sets forth the general confusion as concerns fumigation control; the other one, that I am specifically to discuss, sets forth some of the points on which divergence and confusion have arisen. Both of them point the way to the present need, which is a well thought out, well constructed, effective, uniform law that may be adopted, certainly in its essential provisions, in all communities. The time to construct such a model law or ordinance is now, before the innumerable communities of this continent have each, severally and separately, adopted their own more or less, frequently less, effective control measures.

The paper of Mr. Cousineau and Mr. Legg deserves particular notice because it is the first paper in this country, so far as I know, to take up definitely, in a careful and well considered manner, the subject of municipal control of commercial fumigation. The paper is an excellent one and goes so thoroughly into the difficulties in the way of setting up adequate control of fumigation that these are brought clearly to view and naturally present themselves to further discussion. They present some of the points at controversy which must be settled in order to build up a model law that may be confidently adopted throughout the country.

First, there is the matter of cost. As these writers have stated, the question is one of cost as balanced against safety. What this means in setting up control legislation no experienced health officer need be told. To the fumigator higher

costs mean less business and smaller profits; he will fight to protect his personal interest. Further, the fact that the business of fumigation, though relatively new, has already assumed considerable proportions and is rapidly growing, will tend to increase the opposition to control involving higher costs. That control does involve higher costs not only of material, but of the trained labor to whom the handling of fumigants must be restricted, is obvious.

The point made by the writers that fumigation is bound up with extermination is an interesting example of the economic association of separate (though allied) trades. At present, the great majority of commercial fumigators are also exterminators, and they are today bending considerable effort to insure that any control legislation shall include both fumigation and extermination.

Next we come to a different type of divergence of opinion—that is, the question of warning gas. Whereas the divergence of opinion concerning costs rests between administrative officials on one side, and the fumigators, and to some extent the public, on the other, the use of warning gas presents a divergence of opinion among fumigation experts and, to some extent, administrative officials themselves. Fumigators also object to warning gases, first, on the ground of increased cost, and, second, on the ground of inconvenience, the use of warning gases constituting a considerable nuisance in the handling of fumigants. To go into a discussion of warning gases here would be time consuming and would hardly serve a good purpose. As one thoroughly familiar with the subject, however, it is my opinion that the controversy over them will not be settled until a new gas is developed that reasonably approaches hydrocyanic acid in efficiency and is in itself a warning gas. A great deal of the present difficulty over warning gases is

that they are gases added to the fumigant.

A third major point of controversy that lies in the way of uniform fumigation control legislation is the proposal to require fumigators to establish their financial ability to cover damages, in the form, usually suggested, of a liability insurance policy or a liability bond. The point at issue here is that only firms of unusually good standing can secure such insurance policies or bonds. This, of course, is the principal aim. Practically, it is an excellent method of securing competency among fumigators, but it may be open to question whether it is altogether proper to enlist, for fumigation control purposes, the services of insurance and bonding companies. The interesting point in regard to this feature is that on the surface it appears that it would be far more effective than other means in immediately improving the type of personnel engaged in fumigations. Insurance companies would probably be much more careful as to whom they granted insurance policies than would be political bodies in issuing fumigation permits.

As to the present need for fumigation control, it is not immediately urgent. Deaths from this cause are probably between 10 and 20 a year in the United States, this of course constituting a trifling figure compared to almost any other cause of death. Fumigation, however, is steadily increasing and this figure may be expected to become greater rather than to be reduced in the immediate future. Furthermore, deaths from fumigation are spectacular and are generally widely published. Nearly all of them, as has been pointed out in this paper, are due in the last analysis to some one's carelessness or negligence.

The great majority of accidents during fumigation of inhabited buildings come under four headings:

1. Accidents to fumigators—These are due to pure downright carelessness or ignorance and can generally be traced, in the final analysis, to improper training of the fumigator or lack of discipline by the man in control.

2. Retention of gas in bedding and other upholstered furniture, with its subsequent release after the compartment has been closed. This is the most prolific cause of deaths in the fumigation of homes, and again, in the last analysis, may be ascribed to carelessness or ignorance. At present writing, I am inclined to believe they may be due more to ignorance than carelessness, as I am convinced that the majority of the fumigators are not really aware of the considerable amounts of hydrocyanic acid gas that are absorbed by bedding, nor of the demonstrated fact that it is released relatively slowly, particularly at low temperatures. Incidentally, this is the type of accident in which present-day warning gases generally fail.

3. Entrance into building under fumigation—This type of accident is due either to failure to place guards, or to failure of guards to perform their duties. Punishment of those responsible for this type of accident should be severe.

4. Passage of gas from one building to another through unsuspected openings—This type sometimes approaches nearest to a genuine accident, as the connections may be most obscure. When the gas passes through plumbing conduits, however, only the fumigator is to blame.

In closing, I feel that I should state my belief as to the form in which a fumigation control law should be drafted. The opening statements of this discussion stressed the state of confusion and rapid change in fumigation control. Obviously, to meet such a situation requires a reasonable variable and flexible law, so that I plead for one in which the essential authority and the policy foundations are set forth in the act, but in which, also, provision is made for details of control to be covered by regulations which may be amended (within the act) by the administrative authority.

REFERENCE

1. *Ztschr. f. Desinfekt. u. Gesundheitswesen*, Feb., 1930, pp. 115-131.

DISCUSSION (*Cont.*)

F. S. PRATT

Vice-President, Pacific R. & H. Chemical Corp., El Monte, Calif.

ON November 16, 1930, a well known furniture store in uptown New York City was fumigated by the cyanogen chloride method as advocated in the paper which has just been read. Next door, separated from the furniture establishment by a partition wall was a restaurant. Before the fumigation was completed, 15 people in the restaurant were overcome and 5 of them required hospital treatment.

On the morning of December 12, 1932, a steamship in the harbor of Seattle, Wash., was fumigated by this same method. In the early afternoon the ship was opened and ventilated and passed as clear about 4 o'clock. A member of the crew who came aboard and went to bed about 7 o'clock that evening, was found dead in his berth the next morning.

On the evening of December 31, last, a fishing schooner tied up in the harbor of Gloucester, Mass., was fumigated by this same method. During the evening of the same day a sailor came aboard, opened the companionway and entered the crew's quarters. His dead body was found there the next morning when the boat was opened and ventilated.

In view of these three accidents, the statement of the authors that "no known serious accident can be attributed to the use of HCN-CNCl mixture" must be regarded as incorrect.

While I am impressed by the persuasiveness of the arguments which have been so ably presented by them, I find that they all rest upon this assumption, namely, that if a tear gas is added to a fumigant, the resulting mixture will retain its warning properties through the fumigation period and until ventilation is complete. It seems to me that the fallacy of that assumption is clearly demonstrated by the three cases which

I have cited, the circumstances of which can be easily verified by anyone who chooses.

It has been remarked by Dr. Edward Bocker, a distinguished expert of the Department of Health of New York City, that "unless a warning gas is wholly satisfactory, it is not satisfactory at all"; if a particular warning agent cannot be relied upon every time, it should not be relied upon at all. "Like the safety belt of the window washer, unless it is reliable every time, he is better off without it, otherwise a false sense of security is created which will ultimately result in disaster." Similar views have also been expressed by Dr. J. T. Oberweger, Superintendent of the Division of Sanitation of the New York Board of Health.

As you know, it is necessary for all fumigation operators to be provided with effective gas masks and to wear them constantly whenever they enter a space under fumigation. Whenever the circumstances are such that an operator is compelled to wear his gas mask, his life may depend, and usually does depend, upon the effectiveness of his gas mask, and that of the operator who should go with him. If, as the authors of this paper recommend, a powerful tear gas is added to the fumigant, the gas mask is thereby called upon to perform an additional, and in some respects, more difficult task, for if the tear gas gets to the man's eyes, either through the canister or through a pin hole in the rubber face piece, the man will be blinded and cannot possibly find his way out alive unless someone leads or drags him out. Accidents have been reported—some of them fatal—the circumstances of which fit this explanation.

If I may be permitted to interpose at

this point a few personal remarks to indicate the reason for our interest in the subject matter of this paper, I would like to say that the concern with which Mr. Ressler and I are connected manufactures and sells a considerable number of materials other than cyanide for use in pest control by fumigation and otherwise. All pest control fumigants, properly so called, are toxic to human beings as well as insects. Some are less toxic than others but *when used in a concentration great enough to be effective in insect control, all of them are potentially dangerous to human life.* Everyone, therefore, who deals with the field of domestic fumigation must consider with great care the matter of public safety. We, as manufacturers, regard that obligation as one of profound importance as compared with which any profit which may be gained from the sale of fumigant materials is a matter of distinctly minor importance. We hold no brief against cyanogen chloride as such. On the contrary, those who make and sell it are our customers. They buy our materials, and, while the entire quantity of cyanide which we sell for domestic fumigation is but an infinitesimal part of our total sales, the general adoption of cyanogen chloride would tend to increase rather than decrease our sales volume.

I desire thus to make clear to you the point of view from which we approach the subject matter of this paper because it might be inferred by some that the reason why we disagree with the authors is because we fear that their suggestions if generally adopted would be prejudicial to our financial interest. Nothing could be more incorrect. We disagree because, after very careful study, we are convinced that the plan which the authors recommend is dangerous to human life.

The idea of using tear gases in connection with fumigation is not new. Beginning about 15 years ago, the U. S.

Public Health Service sought suitable tear gases for use in conjunction with hydrocyanic acid. These investigations resulted in the adoption of cyanogen chloride, and attention was called to this fact in amendment No. 6 to the quarantine regulations issued by the Service in 1923. Shortly after, the Service discontinued the use of cyanogen chloride in favor of chloropicrin. More than 5 years subsequent to the abandonment by the Service of the cyanogen chloride method, an eastern corporation which had undertaken the commercial exploitation of cyanogen chloride fumigation gave wide publicity to the subject matter of the 1923 bulletin in such a manner as to make it appear that the U. S. Public Health Service favors the cyanogen chloride method above all others.

In 1930 and 1931 the Bureau of Mines, in coöperation with the U. S. Public Health Service, conducted an investigation which had for its object the finding of a warning agent which could be incorporated into artificial or natural gas sold for domestic use with the expectation that if a warning agent could be found appropriate for this purpose, its use would cut down the number of deaths which are due to accidental asphyxiation. It is reported that in this investigation hundreds of compounds were exhaustively studied at a cost of more than \$20,000 without finding any which were deemed satisfactory.

It is a matter of common knowledge that deaths due to illuminating gas are far more frequent than those caused by fumigations. This fact has been recently confirmed by an investigation of Major C. L. Williams, Senior Surgeon of the Public Health Service. The results of his investigation, which were published a few weeks ago, show that during the 6 months period covered by his study, the number of deaths in the United States caused by fumigation were less than one-quarter of those

caused by illuminating gas and less than 2 per cent of those resulting from the inhalation of all other poisonous gases. Deaths from illuminating gas, therefore, represent a far more important problem of public safety than the hazards arising out of fumigation. Notwithstanding this, the warning gas idea has not yet impressed government officials and others familiar with the facts to the point where warning gases have been adopted in the gas industry. In that industry, the relevant facts have been studied with great care in the investigation to which I have referred (*Bureau of Mines monograph No. 4*, entitled "Warning Agents for Fuel Gases").

It seems appropriate therefore to suggest that before sponsoring the enactment of mandatory legislation which would require the use of a particular warning agent in fumigation, health officers would be wise to insist upon a really careful factual case study of all known fumigation accidents to determine in each instance the cause and what individual or individuals were responsible.

It is, nevertheless, no secret what must be done in order to deal successfully with the hazards of fumigation. There are only two basic requirements. First, the practice of fumigation must be confined, by means of a suitable permit system, to individuals who possess the proper qualifications of training, experience and character; and second, those individuals must be held accountable for the performance of fumigations in accordance with safe practices that are already well recognized. The successful enforcement of such requirements no doubt brings to the health enforcement officer some administrative problems. How serious these problems are I do not know, but however troublesome they may be, it is clear that the vast majority of our cities are handling them successfully today.

In the paper which has just been

read, it is stated that "in accordance with the carefully considered policy of the Health Department of the City of Boston where the above fumigants (cyanogen chloride) have been mainly used, no attempt to regulate fumigation has ever been made." It is not clear to me just what the authors wish to be understood by that statement unless they wish to be understood that wherever cyanogen chloride is used as a warning agent, one may safely relax some of the precautions which would otherwise be necessary. Similar claims have in the past been made by individuals interested in the commercial exploitation of this method of fumigation. Any such suggestion is not warranted by the past record of fumigation in which cyanogen chloride has been used. In the handling of dangerous materials I am prepared to state emphatically that there is no substitute for training, experience, care, and vigilance. I make this assertion on the strength of 15 years' experience during which several thousand tons of hydrocyanic acid has been manufactured and shipped under my personal supervision without a single fatality.

Before I conclude my remarks I should like to quote from two paragraphs of the article by Major Williams to which I have already referred:

During the 6 month survey, the number of deaths reported in the press clippings reviewed which occurred from fumigant gases in the United States totaled 6, while deaths resulting from the inhalation of other poisonous gases numbered for the same period 382.

According to information obtained from available sources, it is estimated that the number of building, railway, and ship fumigations performed in the United States during 1933 was approximately 74,000. Of this number about 60,000 were fumigations of domestic dwellings, 5,000 industrial fumigations, 7,000 railway cars, and 2,000 ships. In addition to these, there are performed yearly a large number of horticultural fumigations, for which it is difficult to arrive at a definite estimate owing to the fact that these fumigations are figured in "acres of glass." There are about

15,000 greenhouse companies in the United States, many of which own long ranges of greenhouses. Greenhouses fumigate at least once every month during the growing season, and mushroom houses several times during the year. The year 1933 having been a subnormal year, the estimates cited above may be considered conservative. From these figures it would appear that the deaths average about 1 to every 6,000 fumigations. . . .

Notwithstanding the relatively small number of fatalities at present occurring from this cause, nevertheless in view of the trend toward increased use of lethal gases for domestic purposes, the adoption of reasonable legislation

for the control of the practice is believed advisable; but at present it is apparently not a matter of justifying emergency or ill-considered enactments.

In conclusion and in view of the known record, I want to say with all the earnestness at my command, that any body which enacts legislation relying on this so-called warning agent for the protection of human life or any public officer who sponsors such legislation, takes upon himself a fearful responsibility.

REPLY TO MR. PRATT'S DISCUSSION

AIMÉ COUSINEAU AND F. G. LEGG

THE discussion of our joint paper by F. S. Pratt, Vice-President of the Pacific R. & H. Chemical Corporation, El Monte, Calif., was not officially listed on the program. In some respects its presentation was a surprise to the authors; on the other hand, we have known for a number of years that the cyanide manufacturers have been opposed to the use of warning gases unless the "perfect warning agent" which will prove effective under any and all conditions, is perfected. We naturally respect their opinions and, although we cannot agree with their conclusions, we welcome Mr. Pratt's discussion and urge its inclusion as a contribution to a subject that is of vital concern to those interested in public safety. The object of any paper is to invite discussion. The more voluminous the comments, either pro or con, the more valuable in proportion will be the contribution to the subject at hand.

Any person or persons sponsoring the enactment of legislation reasonably calculated to afford greater protection to the public, if he or they be sincere, need not be unduly perturbed by the conclusion presented by Mr. Pratt "that any body which enacts legislation rely-

ing upon this so-called warning agent for the protection of human life, or any public officer who sponsors such legislations, takes upon himself a fearful responsibility."

In the last analysis, the public expects, and justly so, that some public minded person or persons will be solicitous for their welfare and will do everything within reason to protect their interests. Mistakes may be made, but efforts in the anticipation of increased safety are justifiable, and any attempt to minimize in any way an existing hazard that cannot be denied appears reasonable.

The authors have not admitted that warning gases, as now used or recommended, are perfect. Our statement in this respect is clear in that we believe that the objections to their use are not serious enough to outweigh the advantages of their use, provided that all known precautions are taken as well.

The citation, of the three accidents, by Mr. Pratt as having occurred where warning agents were employed is not, in our judgment, a sufficient ground for a blanket condemnation of the use of warning agents.

The New York accident mentioned by

Mr. Pratt did not result in any fatality. Had other known precautions been observed, as are recommended by the authors, even with the use of warning agents, the accident might possibly have been prevented. New York does not require warning gases to be employed in fumigation, and because it is alleged that a warning gas was used in this particular instance, and that it did not prove to be 100 per cent effective, is no conclusive proof that warning gases have no value in fumigation. There is the possibility that the warning agent in the instance cited may have had some value in preventing more disastrous results.

At the time our paper was prepared the authors were not in possession of the facts relating to the two cases cited in which the use of warning gases resulted in fatalities in Seattle and Gloucester. We have not, as yet, been able to obtain the official reports of these accidents.

The one in Seattle, we understand, was on shipboard and probably outside of the jurisdiction of the Seattle Health Department as we have reason to believe that the Seattle Health Department did not have complete details at that time. The one in Gloucester was also on shipboard and possibly outside of the jurisdiction of the local health department.

According to our information this last fumigation had been made without the services of a fumigating company, and the most elementary precautions, such as the services of a watchman, who, no doubt, would have prevented the victim from going down the fore-castle of the ship to reach his bunk, after a tiresome day or leave of absence.

It is not our purpose to deny the occurrence of the three instances cited by Mr. Pratt. It is, however, our purpose to assert that if other known precautions had been employed in connection with these fumigations, the mere fact that a warning agent was employed is not in our judgment sufficient proof of the undesirability of warning agents in fumigating practices.

The statement by Mr. Pratt which has reference to the number of deaths caused by illuminating gases as being 4 times those caused by gases used for fumigating and exterminating should be carefully analyzed before any conclusions should be drawn from the statement. It is probably true that a relatively large percentage of all homes in urban communities are provided with illuminating gas services for cooking and for water heaters. Those who have experience in the control of cyanide gas fumigation would, I am sure, have many sleepless nights if fumigation were to be performed over a period of 6 months in every dwelling in the country in which there is a service for gas.

The Part of the Public Health Nurse in the Epidemiology of Syphilis*

Maternity and Child Health Services

HELEN S. HARTLEY

Superintendent of Nurses, San Joaquin Local Health District, Stockton, Calif.

THE relation of the public health nurse to maternity and child health services has long been considered of importance. The interpretation of the part of the public health nurse in the epidemiology of syphilis presupposes that she is one who:

Is prepared or experienced in general public health activities

Recognizes syphilis as a communicable disease

Knows the facts of diagnosis, treatment and communicability of the disease

Appreciates the pathological, social and economic importance of early diagnosis and treatment

Understands that her approach to the syphilitic patient is comparable to that of any other communicable disease

Is acquainted with community agencies and institutions offering diagnostic and treatment services.

It is also assumed that a community employing public health nurses is cognizant of the social and economic importance of preventive as well as curative services, and that some provision is made for them.

The effectiveness of the public health nurse's work is directly influenced by the services provided within the community which limit or increase her op-

portunities for usefulness. Her assistance may be given to patients of private physicians or as part of a free or pay clinic service. Her procedure will be in harmony with the program of treatment of the patient by the physician in office or clinic practice, and her first duty is to know that program.

The home visit gives opportunity for interpretations of many procedures that are quite clear and simple to a member of the profession, but vague to the patient and family. There the nurse finds the best opportunity to stress the importance of medical supervision early in pregnancy and teaches the value of each step. Even though the physician may have explained the meaning of a positive Wassermann and need for treatment, there will be lingering fears or questions needing to be cleared away. Encouragement may be necessary for the patient to continue treatments. Changes in the family régime may be required, and with the aid of the experienced worker, a schedule may be evolved whereby the wage earner's time may be less affected and add to the convenience of the patient and other members of the family.

Transportation is an important factor for the prenatal patient who must also attend the anti-luetic clinic. It is comparatively easy for volunteer transportation to be secured for an occasional

* Read at a Joint Session of the American Social Hygiene Association and the Public Health Nursing Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

visit, but to continue these visits at regular intervals over a long period of time adds complications. However, that such a program can be effected was demonstrated by a member of a volunteer motor corps who left her home before 8 o'clock to bring a mother and her 4 small children to the morning anti-luetic clinic. The time involved was approximately 3 hours, the distance approximately 15 miles, and the volunteer carried on without omission for the entire series of treatments.

Responsibility for the continuation of the mother's treatment after the post-partum period often rests with the nurse. As in any other long continued treatment, there is a tendency to grow lax, and it again becomes necessary to emphasize the need and make new plans for the care of mother and child over prolonged and repeated periods.

A principle applied to all communicable disease control is that requiring examination of contacts. Certainly no public health nurse will fail to bend every effort to secure adequate examination of contacts of a luetic patient although it may present some difficult, and sometimes delicate, situations.

The triangle relationship of clinic, patient, and public health nurse should not be ignored. Of course, the anti-luetic clinic is of prime importance but many of its patients are recruited from other clinics and in proportion to the thoroughness of examinations and system of reporting. The routine of clinic activities offers many opportunities for correlation of programs.

Since syphilis may be passed from mother to child in utero, the prenatal clinic holds a definite place in the control and prevention of syphilis. The patient should be urged to register early in pregnancy and the Wassermann should be part of the routine procedure of the first visit. In one prenatal clinic, all new registrants' names, addresses, and probable dates of maturity are

given to the health department for the prenatal teaching program. The clinic registrar reports to field nurses all positive Wassermanns, and the patient is immediately referred to the anti-luetic clinic for treatment. Patients registered in this prenatal clinic are confined in the hospital where spinal fluid Wassermanns are a routine procedure.

Routine duties of the obstetrical ward include a report to the health department of patients dismissed with address, age, and condition of infant, condition of mother, and special note of lues or other symptom requiring attention. These reports are referred to the public health nurse in whose district the patient resides, and home visits are resumed.

Upon dismissal from the hospital, each mother is given dates for post-partum visits to the clinic. When the mother is dismissed from post-partum care, the baby is transferred to the well baby clinic for supervision throughout infancy and preschool life. In the well baby clinics, observation for control of luetic infections is continued.

Study of 583 maternity patients from this clinic and hospital service in 1 year resulted in finding 10 mothers with positive luetic reaction. Each patient was given at least 2 tests. Reaction of 1.7 per cent is a very low incidence in a highly cosmopolitan clinic group as compared with reports from other parts of the country. In a children's clinic of another California city, also highly cosmopolitan, records of 3 years show 2 per cent of all children registered had congenital syphilis. Since treatment for congenital syphilis is recommended to begin in infancy, the emphasis of the public health nurse may well be upon the care of the very young child.

However, we are told the prevention of congenital syphilis depends upon treatment of the infected mother from the third month of pregnancy until the

infant is born. Here is a definite challenge to the public health nurse to secure adequate prenatal care for each and every woman whether she be the patient of clinic service or of private physician.

Two types of clinics cover supervision and care in child growth and development—supervisory and treatment. Both offer opportunities for diagnosis. Supervisory clinics may be conducted by health departments conforming to recognized public health principles. Treatment clinics, pay or free, constitute the medical relief service for definitely sick children, some of whom may have symptoms directly traceable to luetic origin. Possibly the supervisory clinics deal with children having more obscure symptoms which may respond to treatment.

Many problems arise in correlation of health and social programs from the clinics offering:

Examinations for school children

Examination of families applying for state aid

Examination of children admitted to children's home

Examination of children referred to institutions for correction of social adjustment

Problems may be a challenge to the policies of organizations serving the

people in clinical diagnosis and treatment, material relief, preventive health and educational service. That relief agencies recognize the value of prevention and follow recognition with action is demonstrated by the solution of a problem arising from the examination of a mother applying for state aid. Anti-luetic treatments were needed and the most convenient means of transportation was by interurban railway. The relief agency paid the carfare which amounted to about \$.90 round trip, and felt justified in doing so because of the improved health of the mother.

There are many factors and many workers concerned in the process of correlating programs in the evolution of adequate health and welfare facilities, but given the vision, the public health nurse may play an important rôle, for hers is the opportunity to:

Teach individuals and families to protect their own health and safeguard the health of their children.

Encourage and assist in the adjustment of individual, family and social conditions that effect the health program.

Join with other health and social workers in correlating programs for the welfare of the individual and the community.

Respond to the challenge and assist in the control and prevention of syphilis through public health nursing activities connected with maternity and child health services.

Fish and Sea Food Institute of the United States

ESTABLISHMENT of the Fish and Sea Food Institute of the United States, with headquarters at 80 Broadway, New York, N. Y., is announced. It is "sponsored by the fish industry to promote a better understanding of the advantages of fish and sea food, emphasizing its economy, food value, and taste." At an inaugural luncheon on February 5, attended by dietary experts, health officials, home economists, research experts and others whose in-

terests are increasing the per capita consumption of fish, the speakers included: Harden F. Taylor, a director of the Fish and Sea Food Institute of the United States; William Fellowes Morgan, Jr., Commissioner, Department of Markets, Weights and Measures, City of New York; Agnes I. Webster, home economist, U. S. Bureau of Fisheries; and J. George Frederick, president, Society for the Advancement of Better Living.

Some Observations on the Use of Alum Precipitated Diphtheria Toxoid*

W. T. HARRISON, M.D.

*Surgeon, U. S. Public Health Service, National Institute of Health,
Washington, D. C.*

SINCE Glenny and Barr,¹ in 1931, first described a method for the precipitation of diphtheria toxoid with potassium aluminum sulphate and showed its exceptional antigenic efficiency in animals, evidence has been rapidly accumulating that a single dose will change well over 90 per cent of Schick positive children to Schick negative in 8 weeks. Wells, Graham, and Havens,² in 1932, confirmed the observations of Glenny and Barr in guinea pigs and gave the single dose injection to 98 children, all with strongly positive Schick reactions. At the end of 8 weeks all but 6 had been rendered Schick negative. Graham, Murphree, and Gill³ obtained more than 92 per cent negative Schick reactions in 185 Schick positive children, within 2 to 4 months after a single injection. Baker and Gill⁴ in 197 Schick positive children (22 of whom were older than 13 years) obtained negative Schick reactions in 100 per cent after a single dose. McGinnis and Stebbins,⁵ using 1 dose of precipitated toxoid and working with a representative number of children, all of whom were Schick tested before and after immunization, concluded that—

One dose of alum precipitated toxoid is as effective as 2 doses of toxoid containing 10 units with 0.2 per cent alum added.

They obtained with 2 doses of toxoid containing 0.2 per cent alum and 1 dose of alum precipitated toxoid, 95.4 and 95.9 per cent Schick negatives, respectively, in 295 and 266 children in the age group 5 to 9 years. Thus there does not seem to be any question as to the efficiency of alum precipitated toxoid as an antigen—it is without doubt the most effective agent yet devised for immunization against diphtheria, but it has certain distinct disadvantages which will be mentioned later.

Most workers have indicated that the probable reason for the extraordinary activity of precipitated toxoid lies in the slow rate of absorption of the comparatively insoluble precipitate, the single injection acting as both the primary and secondary stimulus defined by Glenny and Sudmersen.⁶ To test this theory, an experiment was planned wherein the nodule which persists at the site of injection was dissected from the tissues of guinea pigs at weekly intervals, and reinjected into guinea pigs in which the serum had previously been titrated at the 1/250 unit level to insure the absence of antitoxin. Nodules were dissected from 2 to 4 pigs each week up to the 7th, ground in a mortar with salt solution, and reinjected into

* Read at a Special Session on Diphtheria Immunization of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

2 test pigs. These test pigs were bled after 6 weeks, the serum of each pair pooled and tested for antitoxin. Antitoxin was present in the serum of all, those reinjected at the 7th week showing $1/5$ unit per c.c. Thus it is apparent that 1 dose in the tissues of the guinea pig exerts its antigenic effect for at least 7 weeks. Since induration following injection in children may be elicited for as long as 6 to 8 weeks, it seems reasonable to assume that the stimulation of antitoxin production continues for this period.

This long continued antigenic action not only serves as a constant stimulant to the mechanism of antitoxin production but also seems to produce in a few persons hypersensitiveness to the protein contained in a subsequent Schick test. McGinnes⁷ has reported a number of immediate allergic reactions following the Schick test applied 8 weeks after precipitated toxoid, in at least one of which adrenalin was required. Preliminary Schick test in the same children was not followed by unusual reaction. The writer⁸ has described the antigenic action of alum precipitated pollen extract as compared to liquid extract in the guinea pig and has shown that the precipitated extract is a much better sensitizing agent than the same extract before precipitation. It is probable that the explanation for the allergic reactions observed by McGinnes lies in this increased sensitizing action of the precipitated toxoid over the fluid toxoid from which it was prepared. It is of considerable interest that the same immunizing procedure is so highly effective in the production of both antitoxic immunity and protein hypersensitiveness.

In a small number of observations it has been noted that vaccination against smallpox, if done as early as 11 days after injection of precipitated toxoid, may be followed by a localization of the virus around the indurated nodule.

This localization is shown by an aerola equal in size and character to that surrounding the vaccine pustule, and fades at the same time. Vaccination 21 days after injection of toxoid in 11 subjects showed normal vaccinia in 9, and in 2 there seemed a slight tendency of the virus to localize at the site of toxoid injection. Further studies on this tendency of localization of vaccine virus should be made, the site of toxoid injection being carefully examined from the 9th to the 12th day after vaccination. Simultaneous immunizations offer an excellent opportunity for study of these reactions.

The immediate local or general reactions following precipitated toxoid are no more noticeable than those following crude toxoid. Most workers believe that they are less so. The very slow rate of absorption as evidenced by the persistence of an indurated nodule at the site of injection should decrease the allergic reaction due to hypersensitiveness to diphtheria protein. Toxins intended for the preparation of precipitated toxoid should be grown for as short a period as is consistent with the production of a strong toxin in order that the concentration of autolytic products may be kept as low as possible. Good toxins may be produced in 7 to 8 days; and longer cultivation, while increasing flocculating value, probably adds materially to the number and severity of reactions in sensitive subjects.

During the past few months an increasing number of reports of the occurrence of sterile abscesses following precipitated toxoid have been received. These develop in from 6 to 10 days after injection, are very slightly painful, sterile, and heal readily after incision. Some may open spontaneously while many indurated areas develop small points of fluctuation which go on to resolution without surgical interference. To date, all products reported as hav-

ing caused abscesses have either been manufactured from toxins grown for longer periods than 8 days or have contained an excess of aluminum, or both factors have been found to be present. Manifestly, the injection into the tissues of a comparatively insoluble precipitate will of itself set up some degree of local irritation, and any additional irritating factor will necessarily add to the probability of abscess formation, hence the necessity for keeping the content of aluminum and of bacillary protein at the lowest possible figures. While approximately 1.5 per cent potassium alum which is present in toxoids precipitated with 2 per cent alum seems to cause a degree of induration which is not particularly objectionable, the preparation of toxoids which require less alum for precipitation, reducing the aluminum to a still lower percentage, will represent a distinct improvement in the product. The possibility of a very slight residual toxicity in crude toxoids from which the precipitates are prepared must also be considered. Such toxicity would necessarily be so slight as to escape detection by the routine 5 c.c. doses in guinea pigs observed for 30 days, but might conceivably be sufficient to produce unpleasant reactions during the extended period that the precipitate is in contact with the tissues. This point is being further investigated.

Children under 6 years give a minimum of local and practically no general reactions to precipitated toxoid, and since a large proportion of this age group is susceptible to diphtheria, they may be immunized without prior Schick test. Older children, however, in addition to furnishing a lower percentage of susceptibles are more prone to show un-

pleasant reactions and therefore only susceptibles should be injected. Precipitated toxoid is so dependable in its antigenic activity that for practical purposes in mass immunization, a post-Schick test may be omitted, not more than 5 or 6 per cent of children who receive a single dose showing a positive Schick after 8 weeks. The post-Schick test is more difficult to interpret after precipitated toxoid, probably due to increased sensitivity to the protein in the Schick material which is induced by the long continued stimulation during the immunizing process. A heated control is necessary to avoid confusion in doubtful cases.

The enormous advantage of immunization by a single injection needs no comment and the rapidity with which precipitated toxoid is supplanting the older agents is evidence of its popularity with the profession. However, the objection of unpleasant reactions must be kept in mind. There is increasing evidence that these reactions, frequently resulting in abscess formation, are more common than reports indicate, and in order that the product may be steadily improved, field experiences should be reported to central authorities for transmission to the manufacturers.

REFERENCES

1. Glenn, A. T., and Barr, M. *J. Path. & Bact.*, 34:131-138 (Mar.), 1931.
2. Wells, D. M., Graham, A. H., and Havens, L. C. *A.J.P.H.*, 22:648-650 (June), 1932.
3. Graham, A. H., Murphree, L. R., and Gill, D. G. *J.A.M.A.*, 100:1096-1097 (Apr. 8), 1933.
4. Baker, J. N., and Gill, D. G. *A.J.P.H.*, 24:22-24 (Jan.), 1934.
5. McGinnes, G. F., and Stebbins, E. L. *A.J.P.H.*, 24:319-324 (Apr.), 1934.
6. Glenn, A. T., and Sudmersen, H. J. *J. Hyg.*, 20:176, 1921.
7. Personal communication.
8. Harrison, W. T. *Pub. Health Rep.*, 49:462-464 (A r. 6), 1934.

Home Canning and Public Health^{*}

FRED W. TANNER, F.A.P.H.A.

Department of Bacteriology, University of Illinois, Urbana, Ill.

THE art of food preservation by canning in the factory has never been on a sounder basis than it is today. Hundreds of thousands of dollars have been spent to bring the industry to its present position. Spoilage has been greatly reduced and no outbreaks of botulism have been attributed to factory-canned foods packed in America since 1925. This statement becomes still more significant when the relatively small amounts of home-canned foods in contrast to the large amounts of factory-canned foods are considered. The situation for home-canned foods, however, is not so fortunate. Procedures are still recommended to the home-maker which not only give products which may not keep well but which may poison her entire family. Frequent warnings have been given of the danger of inadequate processes. Schoenholz, Esty, and Meyer¹ warned that home-canned foods may be dangerous when they said:

The prevention of human botulism will, therefore, remain a difficult problem until safe processing procedures are employed in the household for the preservation of certain vegetables.

This opinion has been borne out by large yearly tolls of botulism caused by home-canned foods since then. Fellers² made the following statement:

The canning guides, bulletins, circulars, and recipes distributed by state agencies, maga-

zines, women's clubs, and manufacturers of canning equipment contain many erroneous statements and faulty methods which have been directly responsible for several outbreaks of botulism besides causing great losses through spoilage of good human food. Accurate and safe directions for preserving food products should be prepared by state colleges and similar agencies in order that any present faulty, unsafe methods may be rectified.

A similar warning was issued by the California State Department of Health in 1933.³ Despite these emphatic statements, little attention seems to have been given to the problem by some of those who are advising home-makers, and botulism outbreaks caused by improperly processed home-canned foods continue.

Any method of food preservation may be evaluated largely from two positions—spoilage and food poisoning. The former has been almost entirely ignored by some of those who disseminate information to the home-canner. Little actual information is available, however, on spoilage, for the average home-maker keeps no records. Neither is she trained to detect all kinds of spoilage, and undoubtedly many home-canned foods which have started to spoil, are prepared for the table because evidences of spoilage are not sufficiently pronounced. Although this phase of the problem need not be stressed unduly before this Association, spoilage is closely related to poisoning. A preserved food in which considerable spoilage has taken place may be potentially dangerous. *Clostridium botulinum*, the agent of poisoning of greatest

^{*} Read at a Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

interest in this connection, may produce profound changes in the foodstuff. Foods which have undergone such changes would ordinarily be excluded from the diet. However, it is definitely known that toxin may be present without evidences of decomposition.

Few studies seem to have been made on the keeping qualities of foods preserved by methods used by the home-maker. Stienbarger⁴ summarized the results of such studies started by the Bureau of Home Economics in 1917. The period elapsing between processing and opening varied from 2 months to 5 years and averaged 1 year. In general, jars which were stored for longer times showed greatest spoilage. Containers which had imperfect closures were excluded from the summary. Bacteriological examinations were, in general, not made. cursory examination for the usual signs of spoilage (condition of the container, appearance, odor, and sometimes flavor) was the only criterion. Bacteriological examination would probably have shown higher incidence of under-sterilization. Of 3,434 jars and cans of food, most of which were processed in boiling water, 1,659, or 48 per cent, showed evidences of spoilage. Of 783 jars processed in the steam pressure cooker, 93, or 12 per cent, spoiled. Stienbarger, however, pointed out that since some of these jars had been packed, longer processing times have been found to be desirable and 12 per cent spoilage is probably much larger than would be found today. The foods most frequently spoiled were meats, fish, corn, lima beans, and peas. Meats and fish processed in the water-bath showed heavy spoilage.

The report should be read by all who are directly interested in home-canning and especially by those who still favor boiling water processes for non-acid foods. To show a few of the data reported by Stienbarger, Table I has been prepared. Spoilage, it will be seen, is

as high as 71 per cent in one food. In some cases the process times used were shorter than those recommended today, in others they were longer. Comparison of process times used with the foods in Stienbarger's report with those now recommended by some manufacturers of canning equipment indicates that they compare quite well. Sunderlin, Nelson, and Levine⁵ also reported the results of comprehensive studies in home-canning. Their work was carried out "with a view to securing spoilage data and time tables for this method of canning vegetables and meats. . . . Process times found entirely satisfactory, under the conditions of the experiments were 2½ hours for beans and chard, 3 hours for beef and pork, and 20 minutes for tomatoes."

Bacteriological tests on the jars consisted of microscopic examination of the sediment, plate count at 37 and 20° C., and growth in fermentation tubes. No attention was given to anaerobic spore-forming, or thermophilic bacteria, the organisms chiefly responsible for spoilage in canned foods. Furthermore, the majority of the jars were not incubated at 37° or 55° C. before examination. In a pack of green beans the temperatures of storage had a decided effect on the keeping qualities. No difference was observed between basement and room temperatures since no spoilage occurred after 2½ and 2 hr. boiling water processes. However, at 37° C., and 55° C., the amount of spoilage was 66 and 100 per cent respectively. They interpreted this to indicate that sterility was not obtained although products were secured which would keep if stored at sufficiently low temperatures. What would the "keeping quality" have been if all of the jars had been stored at 37° and 55° C.? They reached the conclusion that whether better results would be obtained by the use of the pressure cooker than by the boiling

water bath remained to be seen. Adequate methods of examination of the jars might have given a different picture. The possible relation of food poisoning by *Cl. botulinum* to home-canned foods was not studied. They refused, however, to taste of their foods even though the processes were said to have been satisfactory under the conditions of their experiments.

Spoilage might be considered to be of economic importance mainly and botulism of public health significance. *Cl. botulinum*, however, is a spoilage or-

such a situation will be allowed to continue remains to be seen. In some states serious outbreaks of poisoning had to occur before any real advance could be made in changing unsound recommendations. The outbreaks of botulism which have occurred in the United States for the years 1929 to 1933 inclusive are shown in Table III.* Examination of Table III should convince one that something is wrong with procedures used by home-canners, for home-canned foods are involved in practically every outbreak during these

TABLE I
SHOWING SPOILAGE RECORD OF HOME-CANNED FOODS PROCESSED IN BOILING WATER
(After Stienbarger, 1933)

Vegetable	1919			1920		
	Number	Spoiled	% Spoiled	Number	Spoiled	% Spoiled
Asparagus				127	17	13
Corn	49	35	71	73	66	90
Lima Beans	106	15	14	83	21	25
Peas	62	9	15	61	42	69
Spinach	153	66	43	63	34	54
String Beans	133	52	39	156	79	51

ganism and any pack of non-acid home-canned foods in which there is an undue amount of spoilage may be considered to be potentially dangerous because it probably has been under-sterilized.

As stated above, not an outbreak of botulism has been caused by foods canned in American factories since 1925. This fortunate situation results from the expenditure of large sums of money to learn more about *Cl. botulinum*, heat penetration into canned foods, and other factors important in canning. The situation for canning in the home is not so satisfactory. Each year sees its toll of human lives which, to a great extent, may be credited to some extension services, editors of cookbooks, and manufacturers of supplies for the home canner. In Table II, the recommendations of a number of such authorities are given. How long

years. Stronger evidence that home-canning literature needs revision need not be sought. In the *31st Biennial Report* of the Department of Public Health of California it was stated that since 1889, 192 known cases of botulism occurred, 119 of which resulted fatally. Most of them were said to have been caused by home-canned foods. If graduates of schools of home economics and others who consider themselves capable of recommending procedures for the home-maker do not recognize all bacteriological knowledge, they should be forced to do so by those whose duty it is to conserve the public health. It would be unfortunate to have to resort to legal procedures to indicate that those who distribute unsound literature have some responsi-

* This list is not complete; other outbreaks attributed to home-canned foods were reported.

TABLE II
SHOWING RECOMMENDATIONS TO HOME-CANNERS BY VARIOUS AUTHORITIES

Authority	Date	Vegetables			Meats		
		Oven	Boiling Water	Pressure Cooker	Oven	Boiling Water	Pressure Cooker
Automatic Canning Devices, Inc.....	1931			R			R
Peoples Gas Light and Coke Co., Chicago.....	1933			R			R
Dixie Canner Co., Hot Springs.....	2nd ed.			R			R
Scars, Roebuck & Co., Chicago.....	*			R			R
Montgomery Ward & Co., Chicago.....	*			R			R
<i>Ladies Home Journal</i> , Philadelphia.....	JE 1072			R			R
The Washington Bureau.....				R			R
<i>Good Housekeeping</i>	1931			R			R
<i>The Detroit Free Press</i>				R			R
Burpee Can Sealer Co.....	1934			R			R
<i>The Delineator</i>				R			R
The National School of Pressure Cooking.....	1934			R			R
The Coleman Lamp and Stove Co., Wichita.....	A 225			R			R
Ball Bros. Co., Muncie, Indiana.....	1933	R	R	R	R		R
Owens-Illinois Glass Co.....			R				
Kerr Glass Mfg. Corp., Sand Springs, Okla.....	1934	R	R	R	R		R
International Harvester Co.....	1927		R	R	R		R
Boston Woven Hose and Rubber Co.....	1933	R	R	R	R		R
<i>The Chicago Tribune</i>			R				
<i>The Chicago Herald and Examiner</i>			R				
<i>The Chicago American</i>			R				
<i>The Detroit Free Press</i>			R				
<i>Boston Sunday Advertiser</i>	1933	R	R	R			R
<i>The Detroit News</i>	1932	R	R	R		R	R
<i>The Philadelphia Public Ledger</i>			R				
The American Stove Co.....	1930	R		R	R		
<i>Boston Cooking School Cook Book</i> (Farmer).....	1931	R	R	R			
<i>Foods and Home Making</i> (Greer).....	1931			R			
<i>Every-Day Foods</i> (Harris and Lacey).....	1927		R	R			
<i>The Settlement Cook-Book</i> (Kander).....	1931		R	R			
<i>Successful Canning and Preserving</i> (Malcolm).....	1930		R	R			
<i>The Butterick Cook-Book</i> (Rose).....	1924		R	R			
<i>The Blue Gingham Cook-Book</i> (Wolcott).....	1928		R	R		R	
<i>The Pictorial Review Cook-Book</i>	1931	R	R	R		R	R

TABLE III
BOTULISM OUTBREAKS FOR THE YEARS 1929-1933

<i>Location</i>	<i>Product</i>	<i>Method of Preparation</i>	<i>Cases</i>	<i>Deaths</i>	<i>Remarks</i>
Chicago	Shallots	Imported	2	1	Packed in Italy
California	Persimmons				
Yakima	String Beans	Home Canned	2		
The Dalles	Beets	Home Canned	2	1	
Green Bay	Celery	Home Canned	2	2	
Hudson, Wyo.	Beans	Home Canned	6	4	
Salida, Colo.	Sausage and Tomatoes?		4	2	Newspaper Report
California	Pork Loin	Home Pickled	3	2	
1930 OUTBREAKS					
Trinidad, Colo.	Chili con Carne	Home Canned	3	2	
Sidney, Nebr.	Asparagus	Home Canned	4	2	
Sentinel Butte, N. D.	String Beans	Home Canned	4	4	
Torrance, Calif.	Tuna	Home Canned	5	3	Type B
1931 OUTBREAKS					
Scotts Bluff, Nebr.	Spinach	Home Canned	2	2	Type B proven
Purrell, Colo.	String Beans	Home Canned	3	2	
Amarillo, Tex.	Spinach	Home Canned	2	2	
Los Angeles, Calif.	Antipasto	Imported	3	1	Packed in Italy
Bishop, Calif.	String Beans	Home Canned		1	Type A
Saugerties, N. Y.	Spinach or Chard	Home Canned	5	2(?)	
Grafton, N. D.	Vegetable Salad	Home Canned	16	13	Type A
Newport, Ore.	Salmon (Smoked)	Home Canned	2	2	
Pueblo, Colo.	Corn	Home Canned	42 Chickens		

(Table III Cont. p. 306)

bility to the public. Furthermore, those who interpret scientific data for those who are less informed, must leave nothing unsaid. Improperly processed home-canned foods are hazardous.

Canned food technologists are agreed that non-acid foods must be processed only under steam-pressure. Steam-pressure cookers have been devised for this purpose, but the mere use of such a cooker is not sufficient, for it must be correctly used and the non-technical home-maker must be taught to appreciate the necessity of following instructions which come with the cooker. Some of these instruction books should be more carefully written.

Practically all pressure cookers de-

pend on a pressure gauge alone for controlling temperature. This is probably satisfactory if the gauge is of high quality and all air is removed from the cooker. The pressure gauges furnished with some cookers are probably untrustworthy. However, good canning practice should provide for a reliable thermometer with which the actual temperature may be determined. This is necessary not only because the atmosphere in the cooker may contain considerable air, but because the gauges may become faulty by use year after year without inspection and adjustment. The effect on temperature of various amounts of air in the steam is well shown in Figure I. Stienbarger's

TABLE III
(Continued)

BOTULISM OUTBREAKS FOR THE YEARS 1929-1933

1932 OUTBREAKS

<i>Location</i>	<i>Product</i>	<i>Method of Preparation</i>	<i>Cases</i>	<i>Deaths</i>	<i>Remarks</i>
Pueblo, Colo.	Peppers	Home Canned	2	2	
Biola Fresno, Calif.	Corn	Home Canned	1	1	
Bordeaux, Wash.	Corn	Home Canned	1	1	
Phillipsburg, Pa.	String Beans	Home Canned	2	2	
Verdel, Nebr.	Corn	Home Canned	3	3	
Burger, Tex.	Beet Tops	Home Canned	2	2	
Gordon, Mont.	Pork	Home Canned	4	2	
Glenwood Spr., Colo.	Cauliflower	Home Canned	1	1	
Cleveland, Ohio	String Beans	Home Canned	0	0	
Maryville, Tenn.	Vegetable Soup Mixture	Home Canned	7	6	
Modale, Ia.	Corn	Home Canned	24	23	
Sams Valley, Ore.	Carrots	Home Canned	Chickens Horse and Chickens		

1933 OUTBREAKS

Coeur d'Alene, Ida. (?)	Beans	Home Canned	4	2	
Miles City, Mont.	String Beans	Home Canned	3	2	
Corona, Calif.	Beets	Home Canned	2	1	
Morro Bay, Calif.	Beets	Home Canned	2	2	
Dayton, Wash.	Beets	Home Canned	5	3	
Lakeside, Ohio	Beets (?)	Home Canned	3	2	
Missoula, Mont.	Beet tops	Home Canned	3	3	
Santa Margarita, Calif.	Green Peppers	Home Canned	2	2	
Zurich, Ont.	Tomatoes (?)	Home Canned	3	1	
Alamosa, Calif.	Corn	Home Canned	84 Chickens and Turkeys		
Joseph, Ore.	Spinach	Home Canned	83 Chickens		

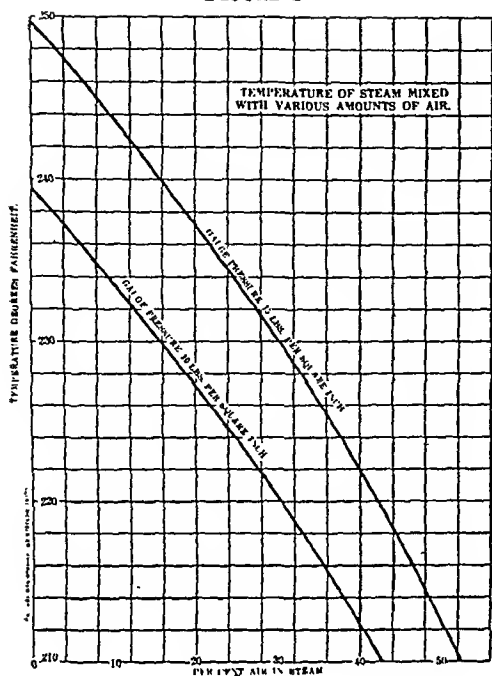
summary⁴ showed 12 per cent spoilage in vegetables and meats processed in the steam-pressure cooker. This would seem to indicate that more attention should be given by home economics extension advisers to recommendations for operating such cookers. The mere use of such cooker may not yield sound foods. One of the outbreaks of fowl botulism reported in 1933 resulted from home-canned food processed in a steam-pressure cooker.

Some of the advice given the home-

maker on the operation of the pressure cooker is quite interesting if not sound scientifically. For instance, the *Ball Blue Book* advises allowing a tiny stream of steam (known as "bleeding" in factory canning) to escape during processing.* The reason given is as follows: "This is done to prevent

* "Bleeding" is a technical term applied to the act of allowing a small jet of steam to escape from the retort or cooker during processing. In this manner, air pockets and the like are avoided and the operator is more certain that all air is driven out.

FIGURE I



suction which results in drawing liquid from jar." *The Ball Blue Book* recommends a pressure of 10 lb. in the cooker with a processing time of 40 minutes for most vegetables, 60 and 90 minutes for a few others, and 120 for sweet potatoes. This would give a temperature of 240° F. These recommended processing times and temperatures are too low for such foods, processed even under steam pressure under conditions which obtain in the steam-pressure cooker. The *Kerr Home Canning Book* is still more ambiguous. It recommends steam pressure of from 10 to 15 lb. (240° F. to 251° F.) leaving the home-canner to choose which she shall use. The advice "All vegetables and meats canned at home should be boiled 10 or 15 minutes before tasting," is sound and necessary and would seem to indicate that they do not have entire confidence in their recommendations. The cooks which are recommended by both of the books just mentioned are shorter than those recommended by the U. S. Department of Agriculture. The fact that the glass container has a

marked retarding effect on the rate of rise of temperature is also important and is not given the significance due it.

Two other methods of processing have been advised since the early days of home-canning—the boiling water-bath and the oven. The boiling water-bath was advised in the earliest bulletins distributed by the U. S. Department of Agriculture. *Farmers' Bulletin 359* advised a 5 hour process in boiling water for vegetables. *Farmers' Bulletin 839* stressed the fact that any food could be canned in the home by methods recommended in that bulletin. Three methods of canning were advised—hot-water-bath at 212° F., water-seal process at 214° F., and the steam-pressure cooker. *Farmers' Bulletins 853* and *1211* retained the methods of former bulletins. *Farmers' Bulletin 1471*,⁷ appearing in 1926, showed the effects of consideration of the results of bacteriological researches. The time-tables for processing foods were arranged for acid and non-acid foods. Experience with botulism had indicated that non-acid foods (vegetables and uncured meats) must receive special treatment. *Bulletin 1471*, therefore, went the entire distance and recommended no other method than heating under steam pressure for vegetables and meats.* The controversies which led to this position were reviewed in a former paper.⁶ Even though this bulletin, revised in May, 1932, stated emphatically that hot-water-bath processing was not recommended for vegetables, the great majority of extension services and bulletins published by equipment manufacturers carried time-tables for processing in the hot-water-bath and oven. They have not accepted the

* Recommendations in this bulletin that the home-maker consult the state extension service, in case of doubt, might be questioned. This is good advice only if the extension service happens to be one which has considered all bacteriological knowledge and does not recommend boiling water processes for vegetables. This recommendation has apparently been deleted from recent revisions of this bulletin.

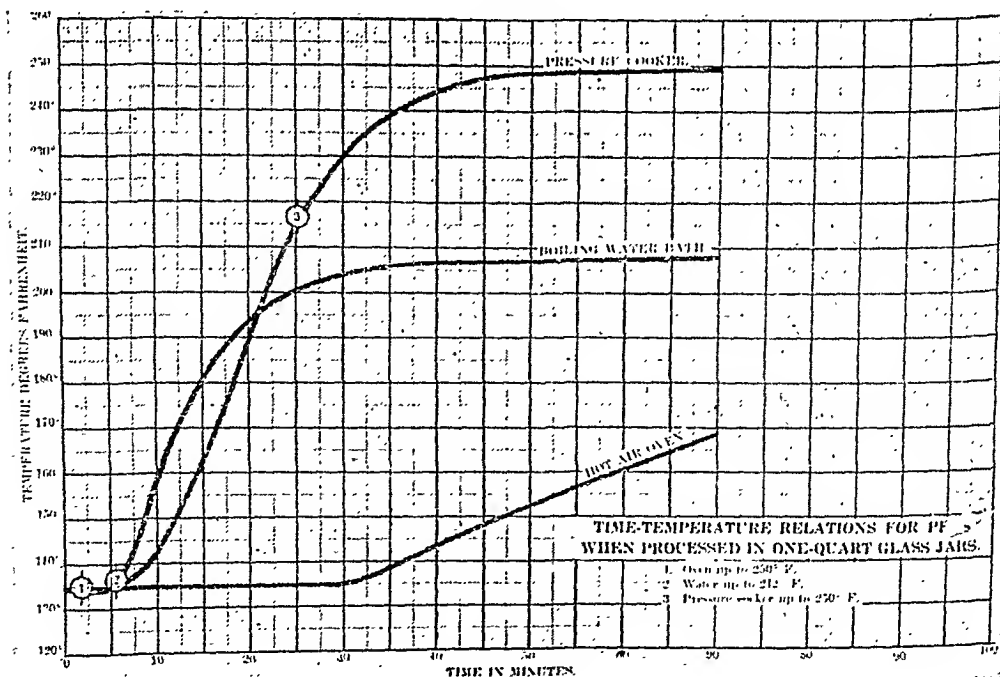
position assumed by the Department of Agriculture. The hot-water-bath process was apparently introduced before much was known about heat penetration. While it may be suitable for acid foods, years of experience with it have shown that it is unsuitable for non-acid foods. It does not sterilize such foods and yields a product in which there is considerable spoilage.

Oven-processing, recommended by manufacturers of some gas ranges and glass jars, is both wasteful and dangerous. Ball Brothers Company recommended this method of processing if the oven is provided with a regulator, since they claim that overheating will cause some "loss of liquid through boiling out of partly sealed jars." They advise starting the time of processing when the required temperature of 275°F . is reached with 3 hours—the maximum heating period for vegetables—even those which have caused many outbreaks of botulism. *The Kerr Home Canning Book* (1933) recommends an oven temperature of 250°F . with a

maximum heating time of 240 minutes (4 hours) for any vegetable. They claim that heating temperatures above 250°F . will cause the liquid to boil too hard and evaporate. They also recommend that processing time be counted when the oven is lighted. Such a process might result in undercooked foods. The danger of boiling is probably not serious since the "coming-up time" of the temperature of the jar is so long that 212°F . might not be reached within the recommended time, with some products at least. Furthermore, unsealed foods cannot be heated above 212°F . irrespective of the oven temperature.

Processing of non-acid foods in the oven will not result in a sterile product or in a product which will keep when stored at higher temperatures. It is probably the poorest method that can be advised for cooking canned foods. At the Indiana Agricultural Experiment Station it was found that if the initial temperature of water in a jar processed in the oven was 68°F . and the oven was

FIGURE II



preheated to 275° F., from 95 to 110 minutes were required for the contents of the jar to reach 212° F. as compared with 20 to 25 minutes in a boiling water-bath. With an initial temperature of 158° F. in the contents of the jar, the corresponding times required in the oven and water-bath were from 50 to 55 and from 15 to 18 minutes respectively. These data were secured with water. In foods solidly packed such as spinach, meat, and sweet potatoes, heat penetration would be so much slower that the temperatures at the center of the jar would not reach 100° C. in any processing time which has been suggested by those who use this method.

The success of any method of processing canned foods is determined largely by the rapidity of heat penetration into the container and the thermal destruction time of spoilage microorganisms at the pressure and temperature. This is easily understood when thermal resistance of *Cl. botulinum* at 212° and 240° F. is compared. The resistance of this organism at 212° F. is 360 minutes while at 240° it is only 10 minutes in neutral phosphate solution. Unless sufficient heat penetrates to the center of the jar to destroy microorganisms the product may spoil. Much sound information is available from careful studies long since reported by Ball,^{9, 10} Magoon and Culpepper,^{11, 12} and Bigelow, Bohart, Richardson and Ball.¹³ These publications cover the subject quite completely and present sufficient data for those advising home-canners, if they will only use them. They need not be reviewed in full, for they are available to anyone interested. Magoon and Culpepper studied the glass jar with various foods.^{13, 14}

In order to show the relative rate of penetration of heat into glass jars processed in the steam-pressure cooker,

in boiling water at 212° F., and in the oven, the curves shown in Figure II were prepared. They were secured by packing peas in regular quart jars and inserting a thermocouple through the cover to the center of the jar. The jars were then placed in the respective heating units; a preheated standard pressure-cooker, a kettle of boiling water, and a gas heated oven preheated to 250° F., for processing. The thermocouples were connected through lead wires to electrical equipment where temperatures at the center of each jar were determined and recorded at frequent intervals during the process. The heating units were operated in accordance with instructions for home-canning except that the pressure cooker was operated at 15 lb. pressure rather than at 10 or 10-15 lb., as suggested in some home-canning books. The oven was preheated in this test although some home-canning books suggest counting time from the time that the cold oven is lighted. The oven was also controlled at 250° F. instead of 275° F., as some home-canning books suggest. Figure II therefore shows the comparable rate of heating of peas in the pressure cooker and in the hot air oven, both operated at the same temperature.

The temperature in the jar located in the hot air oven should not rise perceptibly above 212° F., as the container is only loosely closed, and loss of the product will occur if heated above 212° F. The curves indicate that jars placed in an oven really heat more slowly, and do not obtain a temperature during the process above that reached in the boiling water-bath.

The pressure processes suggested for products such as peas should produce adequate sterilization, however, the boiling water processes of 180 minutes or oven processes of 180 to 240 minutes suggested by some of the prominent home-canning books will obtain only from 10 per cent to 16 per cent of the

* Not connected with a firm with a similar name.

sterilizing value of suitable pressure processes.

As the relation of inadequate processing to botulism and the relatively greater difficulty of processing non-acid foods was established, acidification of non-acid foods with lemon juice or vinegar was suggested. Having established that a hydrogen ion concentration of 4.5 had protective action by inhibiting development of *Cl. botulinum*, it was believed that this could be attained by addition of acid. Non-acid foods are highly buffered; consequently such large amounts of acid would have to be added that flavor would be affected. Sunderlin, Nelson, and Levine,¹⁴ for instance, found that acidification of asparagus and sweet corn with phosphoric or citric acid made a 2 hour process satisfactory, whereas without acid even a process time of twice as long was not sufficient.

The U. S. Department of Agriculture since 1931 has been disseminating through *Farmers' Bulletin 1471* (Stanley)⁷ satisfactory instructions to the home-canner and the department on frequent occasions has emphatically stated that non-acid foods should be processed only in the steam-pressure cooker. Despite this fact, some concerns making canning supplies to be used in the home, and many agricultural extension services still disseminate unsound, if not dangerous, advice. Dr. A. F. Woods, former Director of Research of the Department placed the department on record as follows:

There is now no excuse for continuing to take risks involved in canning non-acid foods without adequate pressure cooks.

All recommendations by this department will hereafter make this clear and emphatic.

Government and state bulletins on home-canning have not heretofore specifically disapproved water-bath processes for non-acid products. The attitude now taken by the Federal Department of Agriculture should greatly reduce the danger from understerilization of home canned foods.

The author (Tanner)⁶ has already reviewed the situation as far as publications of agricultural extension services and government bureaus are concerned. It was pointed out that only 10 of some 45 states which distribute bulletins on the art of home-canning give methods which take into account sound bacteriological knowledge. These are California, Florida, Maine, Nevada, New York, Illinois, North Dakota, Virginia, Washington, and Texas.* While a few other states have stated that non-acid foods (vegetables and meats) should be processed under pressure, they still give time-tables for hot-water-bath and oven processing. As long as such tables are published, it may be assumed that they are given at least tentative approval and are being recommended to the home-makers of the state.

Another source of information for home-canners are publications distributed by manufacturers of apparatus and supplies for the home-canner, magazine, and newspaper food bureaus. Recommendations of a number of such

* The author desires to call attention at this time to certain changes which should be made in the former paper. The letter in the table indicating that North Dakota recommends boiling water process for vegetables should be moved to indicate pressure-cooker sterilization. In the context on page 370, this state is mentioned among those with approved recommendations. Virginia should be added to the list in the context making 8 states which distribute sound advice as indicated in the table. The name McCordic (McCordic) should be deleted from the "author" column after Wisconsin. Mrs. McCordic was the author of a Special Circular, November 1932, in which the steam-pressure cooker was recommended for vegetables. Eight months later in July, 1933, *Circular 261, Home Canning and Jelly Making*, was published in which boiling water processes were recommended for vegetables. Both of these publications bear the imprint

"Extension Service of the College of Agriculture
The University of Wisconsin, Madison"
Mrs. McCordic was apparently not the author of the latest publication (*Circular 263*, October, 1933). *Extension Bulletin 183*, Extension Service, State College of Washington, June, 1933, apparently supersedes the undated mimeographed material used in the first paper. The steam-pressure cooker is now recommended for non-acid vegetables with processes given in *Farmers' Bulletin 1471*. Information is also at hand that the extension service of Maine now recommends the pressure-cooker for non-acid foods.

authorities are shown in Table II. It will be seen that a few give reliable advice about processing vegetables, recommending only the steam pressure cooker. On the other hand, much unreliable advice is still disseminated even by some of the largest manufacturers of equipment for the home-canner. Some 10 advise oven-processing which is known to be wasteful and dangerous while practically all of them recommend the boiling water-bath. Health officers would be justified in insisting that these authorities avail themselves of all bacteriological knowledge.

Many statements in these publications are both misleading and scientifically unsound. For instance the Kerr Glass Mfg. Corp., in a small booklet, *Modern Method of Home Canning*, by Kerr, states that Louis Pasteur gave us the method of pasteurizing milk and proved that growth of bacteria in foods is the cause of spoilage. It then continues, that Pasteur discovered two fundamentals of successful food preservation—complete sterilization of the product, and perfection of absolute airtight seal. The Kerr principle of sealing is said to insure achievement of these results. Complete sterilization cannot be attained by the process times and temperatures recommended on the later pages of this booklet nor in the much larger *Kerr Home Canning Book*. The type of closure on the jar has very little to do with successful sterilization. It is but one of many necessary requirements for successful canning. It may, however, prevent bacteria from gaining entrance from the outside environment after those in the food have been destroyed by the process. This same book gives as the first step for successful canning: "complete sterilization (entire destruction of all micro-organisms such as yeast, bacteria, and mold)." Such a bacteriological utopia has not yet been reached even by factory canners who are using longer cooks.

The recommendation that non-acid foods (vegetables) may be processed in the hot-water-bath and oven, can but lead to a high percentage of spoilage and occasional outbreaks of food poisoning. As long as such processing advice is given in publications, it may be assumed that those who distribute them, recommend them to the home-canner even though they may state that the U. S. Department of Agriculture recommends only the pressure cooker for non-acid vegetables and meats. There is nothing to prevent the home-maker from gaining the impression that a boiling water process is just as satisfactory for non-acid foods as a steam-pressure process. If time-tables are given for such methods of processing, it may be assumed that they are approved. The reader is left to puzzle over the many inconsistent statements.

These statements apply equally well to the *Ball Blue Book of Canning and Preserving Recipes*. It also quotes the recommendations of the U. S. Department of Agriculture to the effect that pressure cookers should be used for vegetables and meats, even though time-tables on hot-water-bath processes for these foods are given. The writer has been informed that canning instructions distributed with the "Presto" jar made by the Owens-Illinois Glass Co., and distributed by the Cupples Co., of St. Louis, are to be made to conform to good canning practice. In their present form they are not acceptable. The statements* made about the publications of several companies in the above paragraphs apply equally well to those of some other manufacturers, as shown in Table II.

* It has been difficult to determine in some publications whether the boiling water process for vegetables is approved. Statements may be made about the danger of such processing and attention called to the position now assumed by the U. S. Department of Agriculture, yet time-tables be published for boiling water. Where a publication included time-tables for such processing, the author has assumed that this method was approved.

That many of those who recommend procedures to home-canners do not have entire confidence in the products is suggested by the oft-repeated advice, "all vegetables and meats canned at home should be boiled 10 to 15 minutes before tasting," or "thoroughly re-heat all canned vegetables and meats before using." The advice is also given that if home-canned vegetables are desired for salad, re-heat and then cool before using.* The statement that the U. S. Department of Agriculture recommends the pressure cooker for non-acid foods appears frequently. These statements indicate that constant fear of food poisoning obtains in the minds of these "authorities." This fear is justified, for every year inadequately processed home-canned vegetables take their toll of human life.

The publications just mentioned are widely distributed in the United States even in those states where home economics and extension services are endeavoring to disseminate only reliable information. While state authorities are insisting on proper methods of processing, the bulletins and circulars distributed by canning supplies manufacturers may do much to interfere with this program. Despite the fact that many of these bulletins quote the position of the U. S. Department of Agriculture on pressure cooks for non-acid foods, they persist in giving the time-tables for oven and water-bath processing of these products.

Some newspaper food bureaus and magazines also disseminate unsound advice. *Capper's Farmer* for February, 1934, had an article on "Tips on Canning Meat," in which the pressure cooker and boiling water processes are

recommended—the latter to be carried out in a wash-tub. Home-makers who follow such advice are bound to have grossly under-sterilized products.

Canning contests are frequently used by some manufacturers and others to stimulate interest in home-canned foods. Foods packed for such exhibitions are judged mainly by color and appearance and not on the basis of sterility. In fact, one home canning instruction book states: "Temperatures higher than boiling tend to injure the delicate color and texture of most fruits."* The implication is then, that color and texture are paramount. Boiling water processes are generally considered to be safe for fruits if the time is sufficiently long.

A part of the unfortunate situation discussed in this paper may be laid at the doors of many departments and schools of home economics. They continue to give in courses and publications advice which is unsound. Many of their graduates are employed by commercial concerns and bureaus disseminating misinformation, and thus the situation is made more serious. Not much improvement can be expected until misinformation is stopped at its source. Those who speak with authority from any position are duty bound to give none but the safest and soundest advice. Fortunately, the situation is beginning to improve. It is significant that the radio is playing an important rôle. The author has heard two talks on home-canning in which the boiling water process was recommended for vegetables. On the other hand, he was told of another in which most trustworthy statements were made.

SUMMARY

The procedures recommended to home-makers of America by some agricultural extension services, newspaper

* This is good advice and is necessary as long as some present methods are used. It is more logical to destroy the organism itself than to attempt to destroy the toxin after it has been formed. The home-maker should make certain that the food has actually boiled for some time. Owing to numerous outbreaks of botulism at high altitudes 10 minutes' boiling may not be sufficient under these conditions

* Such characteristics should be of secondary importance to keeping quality and health hazards.

bureaus, and manufacturers of supplies for home-canners are reviewed and appraised in light of bacteriological knowledge which has been accumulated during the last 15 years. Since there have been no outbreaks of botulism caused by factory-canned foods in America since 1925, and since home-canned foods cause numerous outbreaks each year, it is suggested that this unfortunate situation may be largely due to inadequate recommendations by some of the authorities mentioned above. Arguments are developed to show that those who disseminate advice to home-canners should realize their responsibility to the public in such matters. Non-acid vegetables and meats should be processed only under steam pressure and not in the oven or boiling-water-bath. Until preservation of perishable food products by heating in wash-tubs, wash-boilers, lard cans, and other such containers is entirely eliminated, outbreaks of food poisoning will continue. Although the U. S. Department of Agriculture has placed itself on record very emphatically as opposed to the use of such methods, and distributes a reliable publication to home canners in *Farmers' Bulletin 1471*, only 10 extension services connected to state agricultural experiment stations have seen fit to adopt similar recommendations; these are California, Florida, Maine, Nevada, New York, Illinois, North Dakota, Virginia, Washington, and Texas.

Attention is also directed to the statements made in many publications of manufacturers of canning supplies for the home-maker. Many of them are not only unsound bacteriologically, but

may mislead a home-maker into situations where she may not only subject her family to serious health hazards but pack a product which will show high incidence of spoilage when stored under average conditions in the home. Health officers and other may play a rôle in directing attention to sound practice for preservation of foods by canning in the home.

REFERENCES

1. Schoenholz, P., Esty, J. R., and Meyer, K. F. Toxin Production and Signs of Spoilage in Commercially Canned Vegetables and Fruits Inoculated with Detoxified Spores. *J. Infect. Dis.*, 33:289-327, 1923.
2. Fellers, C. R. Public Health Aspects of Food Preservation. *A.J.P.H.*, 17:470-475, 1927.
3. California Dept. of Public Health, *Weekly Bull.*, Feb. 4, 1933.
4. Stienbarger, M. C. Summary of Home Canning Experiments Showing Effect of Different Times and Temperatures of Processing on the Keeping Quality of Canned Foods. U. S. Dept. of Ag. (Mimeographed Report), 1933.
5. Sunderlin, G., Levine, M., and Nelson, M. P. Studies in Home Canning. II. Indices of Spoilage in Home Canned Foods. *Iowa State College J. Sci.*, 2:289-311, 1928.
6. Tanner, F. W. Bacteriological Problems in Home-Canning Procedures. *J. Home Econ.*, 26:365-376, 1934.
7. Stanley, Louise. Canning Fruits and Vegetables at Home. *Farmers' Bull. 1471*. U. S. Dept. Ag., 1926 (revised in 1933).
8. Indiana Ag. Exper. Sta., *Ann. Rep.*, 1930, pp. 51-52.
9. Ball, C. O. Theory and Practice in Processing. *The Canner*, Jan. 22, 1927.
10. Ball, C. O. Mathematical Solution of Problems on Thermal Processing of Canned Foods. Univ. of California, Pub. in *Pub. Health*, 1:15-245, 1928.
11. Magoon, C. A., and Culpepper, C. W. A Study of the Factors Affecting Temperature Changes in the Container During the Canning of Fruits and Vegetables. *Bull. No. 956*, U. S. Dept. of Ag., 1921.
12. Magoon, C. A., and Culpepper, C. W. Relation of Initial Temperature to Pressure, Vacuum, and Temperature Changes in the Container During Canning Operations. *Bull. No. 1022*, U. S. Dept. Ag., 1922.
13. Bigelow, W. D., Bohart, G. S., Richardson, A. C., and Ball, C. O. Heat Penetration in Processing Canned Foods. *Bull. 16-L*. Res. Lab., National Canners Assn., 1920.
14. Sunderlin, G., Nelson, M. P., and Levine, M. Studies in Home Canning. 1. Some Factors Affecting the Keeping Qualities of Vegetables and Meats Canned by the Hot-Water Bath Method. *Iowa State Coll. J. Sci.*, 2. 189-212, 1928.

Toxicity of Brilliant Green for Certain Bacteria*

EDMUND K. KLINE, DR.P.H., F.A.P.H.A.

Cattaraugus County Department of Health, Olean, N. Y.

THE purposes of this study are best described in the following resolution adopted during the Annual Meeting of A.P.H.A. in Washington in 1932.

Since the practice of incorporating dyes in culture media for the purpose of growth of certain kinds of bacteria is increasing, and since the value of such differential media is dependent upon the toxicity of these dyes; therefore, be it resolved by the Laboratory Section Council of the American Public Health Association that a committee be appointed to consider the possibility of establishing standards of toxicity for such dyes with especial reference to those used in media recognized by the Standard Methods of Water and Sewage Analysis.†

This paper reports a study of the toxic effect of various brilliant green dyes incorporated in a simple culture medium. Since primary interest concerns the ability of the dye to inhibit growth in various media the emphasis

has been placed on bacteriostatic rather than bacteriocidal action.

Bacteriostasis is probably simply a manifestation of vital staining, wherein the reproductive mechanism of the organism is destroyed or at least rendered inoperative. All of the theoretical considerations and experimental evidence that have been advanced regarding the mechanism of staining reactions is applicable in some degree to the present problem. Excellent reviews of literature dealing with this are available.^{1, 2}

DETERMINATION OF BACTERIOSTATIC TITER

There are several possible ways of determining experimentally the bacteriostatic powers of various lots of dyes.

1. Measuring the smallest inoculum that will initiate growth—A method previously used by Dunham and open to the drawback that there is no satisfactory way of measuring small inocula except by dilution methods and that these are subject to rather wide chance variations as the number of organisms in the inoculum becomes very small.

2. Measuring the rate of multiplication following a standard inoculum—The method used by Dunham and Schoenlein in their work on bile brilliant green media in 1926 for the Standard Methods Committee of the American Water Works Association.³

3. Measuring the lag phase in the presence of dye in relation to the normal lag phase in control media—A method for the quantitative determination of bacteriostatic action recently devised by Mary A. Ingraham, University of Wisconsin.⁴

* While this was read as a paper, it is also to be considered as a report from the Referee, presented at the request of the Standard Methods Committee, to the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

† With the reorganization of the Standard Methods Committee this problem was assigned to the section on Diagnostic Methods and Procedures and the author was appointed Referee for this study. Dr. H. J. Conn, Chairman of the Biological Stain Commission and H. G. Dunham, of the Difco Laboratories, both of whom are pioneers in the field of dye standardization, have served as Associate Referees. Advice and assistance have also been received from Harry Jordan of Indianapolis, Dr. Max Levine of Iowa State College, and Frank E. Hale of the Mount Prospect Laboratories of New York City Bureau of Water Supply. The work has all been performed by the Referee in the laboratories of the Cattaraugus County Department of Health, Olean, N. Y.

TABLE I
COMPARATIVE BACTERIOSTATIC ACTION OF TWO BRILLIANT GREEN DYES

Dye Certification Number		CBg4						NBg5							
		Hours of incubation						Hours of incubation							
		Dilution of dye	24	48	72	96	120	168	24	48	72	96	120	168	
a.	Escherichia coli	1:200,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:300,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:400,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:500,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:600,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:700,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:800,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:900,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:1,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:1,250,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:1,500,000	++	++	++	++	++	++	++	++	++	++	++	++	++
		1:1,750,000	++	++	++	++	++	++	++	++	++	++	++	++	++
1:2,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++		
b.	Aerobacter aerogenes	1:125,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:150,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:200,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:500,000	++	++	++	++	++	++	++	++	++	++	++	++	
c.	Citrobacter sp.	1:100,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:150,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:200,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:250,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:300,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:350,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:400,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:450,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:500,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:550,000	++	++	++	++	++	++	++	++	++	++	++	++	
1:600,000	++	++	++	++	++	++	++	++	++	++	++	++			
d.	Bacillus subtilis	1:5,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:10,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:20,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:30,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:40,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:50,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:60,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:80,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:90,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
		1:100,000,000	++	++	++	++	++	++	++	++	++	++	++	++	
e.	Bacillus cereus	1:10,000,000	+	+	+	+	+	+	+	+	+	+	+	+	
		1:20,000,000	+	+	+	+	+	+	+	+	+	+	+	+	
		1:30,000,000	+	+	+	+	+	+	+	+	+	+	+	+	
		1:40,000,000	+	+	+	+	+	+	+	+	+	+	+	+	
		1:50,000,000	+	+	+	+	+	+	+	+	+	+	+	+	

+ Signs indicate bacteriostasis (no growth of bacteria). - Signs indicate growth. Double columns indicate duplicate tubes.

All of these tests in lactose-peptone broth pH 6.9.

4. Measuring the concentration of dye that will inhibit gas formation—The method used by Hale in previous work for the Biological Stain Commission.

5. Measuring the concentration of the dye which will inhibit growth with a standard inoculum.

the results included—composition and reaction of the media, concentration of the dye, activity of the organisms, composition of the diluent, and size of the inoculum.

OUTLINE OF METHOD

Medium—A base medium consisting of 1 per cent Bacto-peptone and 1 per cent Bacto-lactose was chosen. Unadjusted, it had a reaction of pH 6.9 after sterilization.

In devising a procedure to be used in the present studies it seemed that the last method was the simplest and most likely to be properly controlled. The variable factors which might influence

The final volume in the test might conveniently be 10 c.c. A number of test tubes were marked at $7\frac{1}{2}$ and at 10 c.c. Ten grams of Bacto-peptone and 10 gm. of Bacto-lactose were dissolved in 750 c.c. of distilled water, tubed in $7\frac{1}{2}$ c.c. amounts and sterilized in the autoclave. After the addition of the dye and the inoculum, sterile water was added to each tube to bring it to a volume of 10 c.c. so that the medium during the time of incubation had the concentration of the simple base medium.

Dye—The dye was used as an aqueous solution in distilled water prepared in volumetric flasks and added to the medium in such dilution that not more than 2 c.c. nor less than 0.2 c.c. was added to each tube.

Inoculum—After the organisms had been established in the simple base medium (1 per cent Bacto-peptone and 1 per cent Bacto-lactose) by a series of daily transfers, a transfer was made and examined at half-hour intervals until a distinct turbidity was noted. A loopful of this culture was then placed on a hemocytometer under a thin cover slip and examined and counted under oil immersion. If the average number of bacteria present was between 1 and 5 per small square (between 4 million and 20 million per c.c.), the culture was diluted with sterile water to which had been added 1 per cent of the base medium so that the final concentration was approximately 200 per c.c. One-half c.c., or approximately 100 organisms, was then used as the inoculum for each tube.

Test—Proper quantities of the dye to give the concentrations desired in 10 c.c. were added to the tubes by means of sterile pipettes. Each tube was then thoroughly shaken. Dilutions of the culture were prepared in the manner described above, and $\frac{1}{2}$ c.c. of the final dilution, approximately 100 bacteria, was added to each tube. The volume of

each tube was then made up to 10 c.c. by the addition of sterile water by means of a sterile pipette. The tubes were again shaken (in a mechanical shaker) placed in the incubator, and examined for growth at the end of 24 hours and each day thereafter for 5 days. It is recommended that each test be set up in duplicate. Results are recorded as growth or no growth.

NOTES—The simple peptone broth chosen as the base medium supported excellent growth of all the organisms used.

The above method of estimating organisms is one commonly used for counting vaccines. Slight deviations in the size of the inoculum, 50 to 150 organisms rather than 100, did not materially alter the bacteriostatic titer.

The object of using the young culture was to place the organisms in the dye medium at a time when they were in the logarithmic growth phase at which stage they should be most active. The organisms were diluted in a weak culture medium to protect them against the bactericidal effect of distilled water.

The bacteriostatic action of the dye affects the growth of bacteria during the lag phase. It has been found that after this phase immediate and very heavy growth is apparent so that there is no difficulty in determining which tubes show growth by simple examination.

Materials — The Dye Commission furnished samples of several lots of brilliant green including all of those now on the market and Dunham a sample of the original dye (# 190) that he used in the studies of bile brilliant green media on which the present standard medium is based.

Five different organisms were used, *Escherichia coli*, *Aerobacter aerogenes*, *Citrobacter sp.*, *Bacillus subtilis* (Marburg type) and *Bacillus cereus*.

Range of Bacteriostasis—Using the above method high dilutions of the dyes proved to be bacteriostatic. Members of the colon group were usually inhibited between 1:200,000 and 1:400,000, while the spore forming organisms were usually inhibited from 1:10,000,000 to 1:50,000,000. However, test

sets could not always be duplicated in regard to the concentration of dyes which would inhibit or permit growth. For instance, using *Aerobacter aerogenes* and NBg 5, growth was obtained in some series in as low a dilution as 1:25,000 and in other series no growth appeared in dilutions as high as 1:125,000.

Variations within a Test Set—Duplicate tubes within the set usually checked each other very closely but, as would be expected in a biological test of this nature, in a few instances a variation of two or more dilutions occurred.

Aftergrowth effects were frequently encountered wherein tubes negative in 24 or 48 hours would show vigorous growth at later periods. This undoubtedly represented lag phases delayed for periods of 24 hours to a week. It was not surprising to find this as it has frequently been possible to train bacteria

to become dye resistant. Working with brilliant green and *Escherichia coli*, Mary V. Reed and Elizabeth Genung have recently reported a multiplication of 250 times in tolerance of the organism for the dye through 13 transfers to stronger and stronger dye media in 56 days.⁵

Comparative Test Sets—When two dyes, CBg 4 and NBg 5, were set up in parallel series CBg 4, exhibited a markedly stronger bacteriostatic effect, whatever organism was used, as can be seen from Table I.

The 8 available dyes were set up against *Aerobacter aerogenes*. Growth extending over a week of incubation appeared very similar to that already shown. The results at the end of 24 and 48 hours incubation are shown in Table II a.

This experiment was repeated using *Bacillus cereus* with results shown in Table II b.

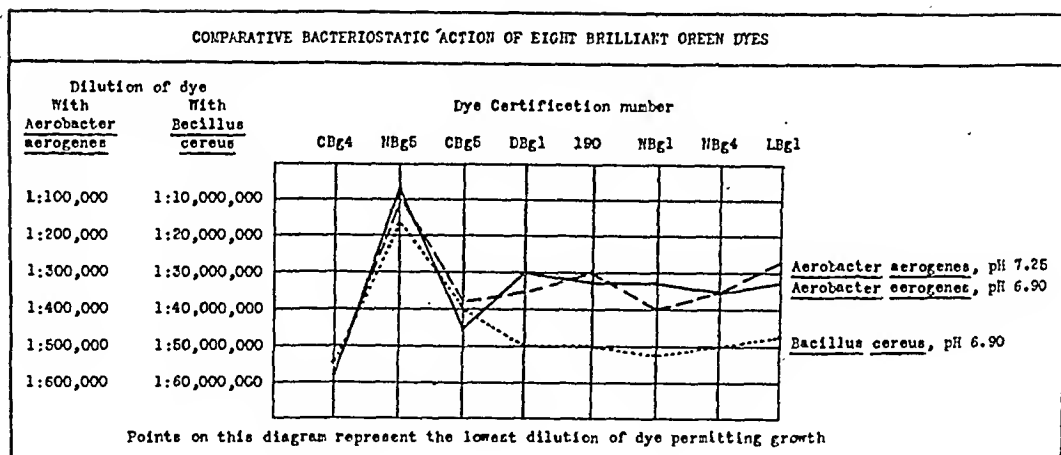
TABLE II
COMPARATIVE BACTERIOSTATIC ACTION OF EIGHT BRILLIANT GREEN DYES

Dye Certification Number		CBg4		NBg5		CBg5		DBg1		190		NBg1		NBg4		LBg1	
Hours of incubation		24	48	24	48	24	48	24	48	24	48	24	48	24	48	24	48
Dilution of dye		+															
a.	<i>Aerobacter aerogenes</i> pH 6.9	1:50,000	++	++	+	-	++	++	++	++	++	++	++	++	++	++	++
	1:100,000	++	++	-	-	++	++	++	++	++	++	++	++	++	++	++	++
	1:200,000	++	++	-	-	++	++	++	++	++	++	++	++	++	++	++	++
	1:300,000	++	++	-	-	++	++	-	-	+	-	+	-	++	-	++	-
	1:400,000	++	++	-	-	++	-	-	-	-	-	-	-	-	-	-	-
	1:500,000	++	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1:600,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1:700,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
b.	<i>Bacillus cereus</i> pH 6.9	1:5,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	1:10,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	1:20,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	1:30,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	1:40,000,000	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	1:50,000,000	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-
	1:60,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1:70,000,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
c.	<i>Aerobacter aerogenes</i> pH 7.25	1:50,000	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
	1:100,000	++	++	-	-	++	++	++	++	++	++	++	++	++	++	++	++
	1:200,000	++	++	-	-	++	++	++	++	++	++	++	++	++	++	++	++
	1:300,000	++	++	-	-	++	+	++	++	++	++	++	++	-	++	++	-
	1:400,000	++	++	-	-	++	+	++	++	++	++	++	++	+	++	++	-
	1:500,000	++	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1:600,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1:700,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

+ Signs indicate bacteriostasis (no growth of bacteria). - Signs indicate growth. Double columns indicate duplicate tubes.

All tests in lactose-peptone broth at the pH indicated.

CHART I



In view of the fact that brilliant green is commonly used in water analysis in combination with bile at a pH more alkaline than 7.0 it was thought desirable to determine whether the dyes would act the same at a higher pH. Therefore, the above experiment was repeated with a medium of pH 7.25 and essentially the same results obtained, as shown in Table II c.

In order to compare the results given in the last 3 tables the average readings of the tubes shown in those tables are plotted as a curve in Chart I.

DISCUSSION

A method has been presented by which it seems possible to determine the bacteriostatic titer of any given sample of brilliant green. Using this method indications have been obtained that there are distinct differences in the relative toxicity of various batches of this dye. One particular batch, for instance, has been found distinctly more toxic and another distinctly less so than the average run of samples. Data are still too meager, however, to permit definite conclusions at the present time.

It is hoped that other laboratories may be stimulated to check this work and that if possible other methods of measuring bacteriostatic titer can be utilized as a further check. The im-

portance of laboratories doing experimental work recording, in every instance, the lot number of the certified dye which they are using should be again emphasized at this time. The Referees are most anxious to obtain reports of any work which has a bearing on this subject. They in turn will be glad to furnish information on any of the dyes tested to persons interested in bacteriostatic titers.

The dyes which have been used in these experiments include samples of all lots of brilliant green now on the market under certified labels.

The Biological Stain Commission will hereafter refer all samples of brilliant green submitted to them to the Referee, and bacteriostatic titers will be determined and these will be available to any laboratory interested in them.

REFERENCES

1. Churchman, John W. *The Newer Knowledge of Bacteriology and Immunology*, Jordan and Falk, University of Chicago Press, 1928, p. 19.
2. Conn, H. J. Commission on Standardization of Biological Stains (2d ed.), 1929, p. 160.
3. Dunham, H. G., and Schoenlein, H. W. *Stain Technology*, I, 4:129 (Oct.), 1926.
4. Ingraham, Mary A. The Bacteriostatic Action of Gentian Violet and Its Dependence on the Oxidation Reduction Potential. *J. Bact.*, XXVI, 6:573 (Dec.), 1933.
5. Reed, Mary V. The Effect of Certain Tri-Phenyl Methane Dyes on *Staphylococcus Aureus* and *Bacterium Coli Communior*. Thesis Smith College, 1933.
- Reed, Mary V., and Genung, Elizabeth. *J. Bact.*, XXVII, 29 (Jan.), 1934.

The Plague Situation^{*}

W. H. KELLOGG, M.D., F.A.P.H.A

Chief, Bureau of Laboratories, State Department of Public Health, Berkeley, Calif.

IT is just 40 years since the present pandemic of plague began with the appearance of an epidemic in Hong Kong and just 34 years since it reached California. Arriving in India from Hong Kong it found favorable conditions and soon after 1900 the deaths reached a million per year. Even now after nearly 40 years of continuous activity the deaths from plague in India are occurring at the rate of 3,000 to 4,000 per week. Considered in the light of the known history of plague there is nothing unusual in these facts, nor is there in the length of time it has been continuously present in California any ground for believing that it is dying out and will shortly disappear.

It is characteristic of plague that its period is very slow and the rise and fall of epidemics is measured in decades and centuries. Upon its appearance in a country it is sometimes years before its presence is manifested by any great mortality, and in the subsidence of a pandemic its final disappearance is interrupted by sporadic localized outbreaks. The long range periodicity of plague, as well as its persistence, is well shown in the history of plague in England where it finally disappeared in 1680 after an almost continuous presence for 136 years. The Great Plague of London occurred in 1665 with about 70,000 deaths, but there had been previous to that time and within the 136 year period 5 epidemics with from

10,000 to 35,000 deaths at intervals of 30, 10, 22, 11 and 30 years.

The following from Procopius of Caesarea, in his History of the Persian Wars describing the pandemic of the 6th century—which is the first authentic historical pandemic—is interesting in its parallelism with more modern appearances:

It arose in Egypt with the inhabitants of Pelusium, then dividing spread one way through Alexandria and the rest of Egypt, the other into Palestine which borders on Egypt, and then traveled over the world always advancing with a progress marked by certain definite spaces of time. For it seemed to advance by a certain law and to demand a certain space of time in every country, discharging its venom against no one on the way casually, but spreading on this side and on that to the uttermost ends of the world as if it feared lest incautiously it should pass by any corner or recess upon earth. It spared neither island nor cave nor mountain top where man dwelt. If it passed over any place only slightly or mildly touching the inhabitants, it returned there afterwards leaving untouched the neighbors against whom it had spent its rage before and it did not depart from there before it made up the full measure of the dead in proportion to the amount of destruction which it had brought on its neighbors. Always beginning at the sea coast it spread into the interior. In the second year it reached Byzantium about the middle of the spring where, as it happened, I was staying.

The great epidemics of ancient times seem to have been of the bubonic form, although it must be remembered that historical accounts of plagues include all epidemic disease, typhus, smallpox, etc., as well as plague, and it is only the description of buboes by some of the writers that identify bubonic plague. Pneumonic plague might have occurred,

^{*} Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

but for authentic accounts of pneumonic plague epidemics we have only comparatively small outbreaks in recent years in Manchuria, in limited districts of India, and on a still smaller scale in California. There are, however, references seeming to indicate that pneumonic plague accompanied some of the bubonic outbreaks and therefore doubtless occurred alone.

Guy de Chauliac in his description of the plague at Avignon, which was part of the second historical pandemic in the 14th century, says:

The plague commenced with us in January, it continued seven months during which time it appeared in two forms. During the first two months it was accompanied with a continuous fever and with a coughing of blood. All who were attacked died in three days. During the other months the continuous fever was accompanied with tumors and boils which appeared in the external parts of the body, chiefly in the arm pits and in the groin. Those who were thus attacked died in five days.

As with illness of the individual, the prognosis is of great interest and importance to him, so also with the commonwealth, when plague is endemic is a prognosis of interest. Reviewing the past history of the disease an attempt may be made to predict what the future has in store for California and for the rest of the nation. It soon develops, however, that about the only thing that is certain about plague is the uncertainty of its disappearance and that usually about a century is required for it finally to flicker out. This is the history of human epidemics. But how about the endemic foci where plague lies dormant during the intervals between epidemic or pandemic spread? The natural reservoir of plague is in wild rodents of squirrel or groundhog type and the historical foci are districts in Arabia along the Red Sea, in Mesopotamia, in Thibet, in Yunnan in China, and in Uganda in Africa. More recently endemic foci have been estab-

lished in Manchuria from which the pneumonic epidemics of 1910 and 1916 originated, and in California where the native rodent concerned is the ground squirrel, *Citellus Beechii*.

The rat as a carrier of plague seems to be subject to the rise and fall of epidemics the same as is his human associate. When plague disappears from a human population it leaves the rat population also, but the enzoötic does not exactly coincide with the epidemic. It usually precedes it and is likely to linger longer. The source of human bubonic outbreaks is the rat and the source of rat plague is doubtless contact with wild rodents in some endemic focus. The primary source of plague, therefore, is the wild native rodent and the distributor is the rat which travels in ships and visits all lands. The rat occasionally returns the infection to wild rodents in some new locality, thus establishing a new endemic focus. This happened in California shortly after the introduction of plague into San Francisco about 1900,¹ and presumably the point of contact was in the vicinity of the Port Costa warehouses. At any rate squirrel plague was first found in that vicinity, and the enzoötic soon reached large proportions.

The record of plague in California is as follows:

March, 1900—Bubonic plague appeared in San Francisco, principally in the Chinese colony, and a total of 121 cases with 113 deaths occurred over a period of 4 years.

May, 1907—Bubonic plague again appeared in San Francisco. The total number of cases over a period of 6 months was 160 and the deaths 78. This time it was not confined to Chinatown, but scattered over the whole city.

August, 1908—Plague proven to be present among the ground squirrels of Contra Costa County.

May, 1907, to December, 1918—Sporadic cases of human plague to the

number of 11 with 5 deaths occurred in the counties of Alameda, Contra Costa, San Benito, Santa Clara, San Joaquin, and Stanislaus. Squirrel plague found to be present in the same counties as well as in Fresno, Monterey, San Luis Obispo, Santa Cruz, San Mateo, Merced, and San Francisco.

August, 1919—An outbreak of pneumonic plague in Oakland with 13 cases and 12 deaths.

1919 to 1924, inclusive—Six sporadic cases with 2 deaths occurred in Alameda, Monterey, San Benito, and Santa Cruz Counties.

October, 1924—An outbreak of pneumonic plague in Los Angeles with 32 cases and 30 deaths.

November, 1924—Five cases of bubonic plague with 3 deaths in Los Angeles County.

1925 to 1933—Seven sporadic cases with 5 deaths in the counties of Los Angeles, Santa Cruz, Monterey, and Santa Barbara.

1934—One human case in Tulare County. Also a large epizootic among ground squirrels of Tulare and Kern Counties, over 200 positive specimens being found among those sent to the laboratory. Furthermore, an epizootic was discovered among the ground squirrels of Modoc County in the northeastern corner of the state on the eastern side of the Sierras.

This chronology of plague in California shows that we have had 2 bubonic epidemics, the first in San Francisco from 1900 to 1904, and the second in San Francisco and Oakland in 1907 and 1908. We have had 2 pneumonic epidemics, the first in Oakland in 1919, and the second in Los Angeles in 1924. We have had in all 35 sporadic cases with 19 deaths, mostly in rural districts and of squirrel origin, 9 counties being represented. Squirrel plague has been found in 19 counties.

The plague situation on the West Coast is of interest to health authorities

throughout the country as will be appreciated by a consideration of what the possible answer is to certain questions which immediately present themselves: First, what is the probability of plague dying out before long? Second, what is the significance of ground squirrel infection? Third, is plague in California a menace to other states?

The answer to the first question is written in the history of plague, and from the brief references to that history already quoted in this paper it may be suspected that the chapter is not finished and may not be for many years to come. This is made all the more certain when it is remembered that there is every reason for believing that the historical epidemics and endemics were rat-borne and in course of time they did come to an end, whereas plague has been kept alive continuously in particular habitats where the rodent concerned was not the rat but a wild native animal such as the marmot. In these localities plague has not, so far as anyone knows, ever completely disappeared. Such a focus now exists in the California ground squirrel.

In answer to the second question we find the most disquieting aspect of the whole problem. In rat plague pneumonia is not a common finding. Guinea pigs inoculated from rats rarely show lung involvement. In squirrel plague pneumonia is common. Guinea pigs inoculated from squirrels very frequently present a pneumonia. The Oakland outbreak of 13 pneumonic cases, which group included 2 nurses and 2 doctors, was started by contact with squirrels, the first man having been squirrel hunting just before his onset. His case was primarily bubonic (axillary) with pneumonia supervening. The Los Angeles epidemic is not so easily traced to squirrels although in the rodent survey following, both rats and squirrels were found infected. There would seem, therefore, to be some

ground for the theory that pneumonic plague is the result of a development of a specific organ virulence on the part of the prevailing strain of *B. Pestis* by passage through a particular species of rodent. In this connection Dr. Wu Lien Teh says ²:

The idea that the species of rodents involved in the epizootics might influence the character of subsequent epidemics is a very fascinating one. Especially it has to be considered if a close relation does exist between epizootics in certain wild rodents and human outbreaks of pneumonic plague. In fact, a world-wide study of the disease both in rodents and in man as undertaken by our staff within recent years has yielded many data supporting this view. On the other hand, in some countries where only ordinary rats are involved the incidence of lung pest is conspicuous also. But before reaching any final conclusions the following points should be considered: (1) Though ordinary rats are sometimes found to be the original source of pneumonic outbreaks, in many instances the local rodents were not involved, the disease having been imported from outside by human agency, namely, by travelers incubating the disease. (2) How long has the disease existed in the local rats? In some plague areas with rat epizootics pneumonic plague was frequent soon after the introduction of infection but became rarer afterwards. One might consequently suggest that the longer the infection continues among ordinary rats the less chance there is for pneumonic plague to appear in man.

Finally, the significance of ground squirrel infection, leaving out of consideration any bearing it may have on the type of human plague, lies in the fact that a new endemic focus has been established and these endemic foci, constituted as they are of wild rodent infection, are so far as anyone knows at present permanent and everlasting.

The third query—Is plague in California a menace to other states?—I would answer by saying, yes, for the following reasons: (a) Because of the possibility of direct extension of the disease in the wild rodent population across state lines. We have recently discovered plague among the ground

squirrels of Modoc County, 400 miles from the nearest previously known plague area and close to the state lines of both Oregon and Nevada. For all we know it has already crossed over into both states. (b) It may travel by transference to the rats in some borderline urban area, the rats traveling, as is their wont, in freight cars or ships to new and distant localities. (c) The last reason to be mentioned necessitates a return to the epidemiology of pneumonic plague. Teague and Barber,³ as a result of their investigations in Manchuria, believe that the essential conditions for a rapid spread of pneumonic plague are a low temperature with considerable humidity, thus permitting droplets containing plague bacilli to remain suspended in the air a longer time and at the same time preserving them against the destructive influence of warmth and drying. They point out that the greatest pneumonic epidemic of modern times occurred in Manchuria in the winter of 1910–1911 when the temperature was many degrees Centigrade below zero; also that in India only 2 to 5 per cent of the cases are pneumonic and no large pneumonic outbreaks have occurred there except one with 1,400 deaths in Kashmir at an elevation of about 5,000 feet and in very cold weather. If we accept the plausibility of Teague and Barber's thesis we must admit the possibility of some person during the incubation period of plague traveling east in the winter time. Should this traveler develop an axillary or cervical bubo with a secondary pneumonia, the stage will be set for a rapid man to man transfer of a form of the disease that has no rival in the rapidity of its spread and the certainty of a fatal outcome.

REFERENCES

1. Kellogg. Present Status of Plague with Historical Review. *A.J.P.H.*, Nov., 1920.
2. Reports of North Manchurian Plague Prevention Service, 1927–1928.
3. *Philippine J. Sci.*, 1912, p. 157.

Rôle of the Sanitary Inspector in the Public Health Program*

C. E. WALLER, M.D., F.A.P.H.A.

Assistant Surgeon General, U. S. Public Health Service, Washington, D. C.

PHYSICISTS tell us that if it were possible for us to rise straight up from the earth at a rate of speed greater than the speed of light, theoretically we should be able, if we could stop our flight and remain stationary, to look downward and see unfolding before us the history of the past. If we could ascend high enough, we should be able to witness important events which took place centuries ago. It would be most interesting if we could, in this manner, look down today upon the health activities of the average small city of 30 or 40 years ago in this country, and follow, up to the present time, the rapid evolution of scientific public health practice which has taken place within the past 3 or 4 decades.

We should see, before the beginning of this rapid evolution, little or nothing of the well developed, efficient, scientific health organization such as we have in most of our large cities and many of the smaller ones today. Looking into the organization and activities of the average small urban community of 40 years ago we probably should see no health department at all. The health officer, if there were one, would be a physician engaged in private practice, employed on a part-time or fee basis chiefly to administer medical care to the indigent and

to prisoners in the city jail; or perhaps he would not be even a part-time physician. He might be a lay individual, without training, whose duties would be concerned chiefly with the enforcement of such health laws or regulations as existed at that time. The part-time medical health officer would do some vaccinating when smallpox appeared in the community; he would order cases of smallpox to the pest house; he would direct the sanitary inspector, if there were one, to put up the yellow flags on houses where cases of the more dangerous communicable diseases might exist; he would order the fumigation which must follow every case of contagious disease; and occasionally would direct that all damp places about private premises be thoroughly limed. The sanitary inspector in the smaller cities frequently would be some member of the police force occasionally utilized on quarantine work or inspection of premises.

I can well remember how, as a boy, I used to spend hours cleaning and liming the place where our kitchen sink drained, especially when typhoid fever would appear in the community and we were directed by the city sanitary inspector to "clean up." Most of the people and a considerable number of the health officers of that day still believed that communicable diseases were caused by sewer gas, stagnant ponds and the like. It was quite generally accepted that diseases like typhoid fever

* Read at a Joint Session of the California Association of Sanitarians and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

could "breed" *de novo* in filth or dampness.

I recall quite vividly the days of the "shot gun" border quarantine maintained by the states when yellow fever would prevail in the South, and I remember seeing mail perforated to facilitate fumigation when it was thought that yellow fever might be transmitted through the medium of a letter. I have heard older officers of the Public Health Service tell of the days when the rock ballast of ships was disinfected with bichloride of mercury, and even a locomotive was swabbed in a disinfecting solution, to prevent the spread of yellow fever. In the meantime, the *stegomyia* mosquito—since, in keeping with progress, given the more up-to-date name of *Aedes aegypti*—went merrily along with its business of spreading the deadly "yellow jack." It had not generally become known that malaria is a mosquito-borne disease, and people still feared the "night air" from swamps. The green scum on a pond was considered deadly. Milk was given little consideration as a possible vehicle of infection. When an epidemic of typhoid fever occurred in a small town it seldom excited suspicion that the municipal water supply might be polluted. Sewage was piped to the nearest creek or river and a sewage disposal plant was a refinement rarely seen. No one thought of the insanitary privy as playing an important part in the spread of intestinal infections in small towns and rural communities. Most of the "outhouses," as they were called, were of the open-back type; the excreta were deposited on the ground and the accumulations were removed only when it became absolutely necessary.

At that time, although considerable progress had been made in the identification of the organisms causing many of the communicable diseases, comparatively little was actually known of the epidemiological factors responsible for

their spread. Communicable disease control consisted, in large measure, in effort to prevent the spread of infection by application of police measures to prevent contact—isolation and quarantine—and in terminal disinfection, chiefly fumigation.

Then came the challenge of efficiency of police methods from Dr. Charles V. Chapin, recently retired as Health Officer of Providence, R. I., after 40 years of distinguished service, who presented an entirely new conception of scientific control of communicable diseases and demonstrated the soundness of his views by putting them into practice in his own community. Rapid progress began to be made in working out and establishing the epidemiology of many of the communicable diseases. Gorgas, Carter, and LePrince showed the way in the control of mosquito-borne diseases in Cuba and in the Canal Zone. Lumsden, of the Public Health Service, demonstrated in Yakima County, Wash., that the prevalence of typhoid fever could be reduced in large measure in rural and semi-rural communities by installing sanitary privies.

Stiles discovered the widespread existence of hookworm disease in the southern states, and the Rockefeller Foundation brought forward the sanitary privy as a means of protecting the population from this scourge. It is interesting to note that the full-time county health unit of today had its beginning largely out of the early work done by the Public Health Service and the Rockefeller Foundation and the state health authorities coöperating with them to improve excreta disposal conditions in the rural areas. At about the same time the importance of other purely environmental factors in the spread of communicable diseases began to be more widely recognized. The need for certain technical knowledge and training not possessed by the medical health officer became apparent, and

the result was the development of the public health engineer. The duties of the sanitary inspector underwent a revolutionary change and he began to find an important place in a scientific program for the real control of communicable diseases.

The sanitarian of today who would intelligently plan measures for the control of communicable diseases must constantly bear in mind the fundamental truth that the perpetuation of every communicable disease is dependent upon 3 factors: (1) the existence of a source of infection—the sick individual, the “carrier,” or the infected animal; (2) the availability of susceptible individuals or animals; (3) the existence of a means of transmission of the infection from the sick to the well. These factors may be likened to the links of a chain in which the infected individual or animal and the susceptible host take the part of rings, joined together by the events of communication. New links are constantly being added as the infection is communicated from one individual to another; and the forging of the chain continues indefinitely unless the progress of the disease can be interrupted by removing one or more of the links. The point at which the chain may be broken most easily varies with the particular disease with which we may be dealing. In some instances the only practicable method of attack available lies in an attempt to remove the source of infection—by isolating the infected individual or rendering him non-infective through treatment; in others, the elimination of the susceptible human host through immunization, or the eradication of animal hosts, such as rodents responsible for the spread of bubonic plague and typhus fever, may present the most effective means of breaking the chain; while in still another group of diseases the greatest promise of success lies in efforts to interrupt communication of the infection

from the sick to the well by removing the channels through which the infection may be carried. Some of the communicable diseases present opportunities for attack at 2, or perhaps all 3, points in the chain; and here one may elect to direct his control activities at 2 or 3 points, or he may choose to concentrate his attack on what he believes to be the most vulnerable single link.

The determination of what may be the most effective method of attack must be based upon thorough knowledge of the epidemiology of the disease. Since certain diseases, or groups of diseases, can be transmitted only through more or less definitely established channels, or may present only limited opportunities for breaking the chain of infection, efforts toward control must be specific if they are to be effective.

The public health administrator must know where the attack can be directed to best advantage in the control of each disease, and, if his facilities are limited, he must be prepared to choose wisely in selecting methods and determining the point or points upon which he will concentrate his activities.

I am reminded of the story about the highly specialized mechanic who was called in, after a number of others had failed, to determine what was wrong with a certain complicated engine which could not be started. After examining the engine very carefully for a few minutes, this mechanic selected a particular part of the engine and struck one blow with his hammer, whereupon the machine started immediately. He then rendered a bill for \$500 for his services. The owner of the engine objected to what he thought was an overcharge and demanded an itemized statement. The statement received read, “Five dollars for one tap, and \$495 for knowing *where* to tap!”

We know now that the control of communicable diseases must be based upon thorough knowledge of the epi-

demological characteristics of each disease and that our control activities must be specific to be effective. We have learned that some diseases will yield most readily to environmental sanitation—the safeguarding of water and milk supplies, improvement of excreta disposal conditions, eradication of animal hosts, and the like; that others may be controlled effectively only through protection of the susceptible human host; and that in still others the only hope of success at present lies in control of the sick individual by isolation or treatment, or in reducing mortality through the prevention or management of the serious complications of certain acute infections. We have gained a new conception of what the control program of the modern health department should be and have seen that the program of today must bring into play the combined resources and activities of the health officer, the sanitary engineer, the sanitary inspector, the public health nurse, and the practising physician.

The sanitary inspector of this day is, or should be, least of all, just an inspector and a law enforcement officer. If he is experienced and wise, he knows that an attempt to perform public health work through law enforcement alone does not produce the best results. After all, accomplishment in much of our public health procedure lies in what we may be able to persuade the individual to do for himself. The trick behind success in public health work, as well as in all other movements for the public welfare where coöperation of the individual is essential, is leading people to do things because they *wish* to do them.

There is a very definite place for the sanitary inspector of today in the modern program for the control of communicable diseases. Just as the public health nurse is taking the place of the old-time quarantine officer in the application of control measures carried out

in the home and school and making for herself a well defined and essential position in the health department, so the sanitary inspector, if he be assigned to proper duties, can become one of the most important and essential components of the organization for control of communicable diseases in his community. To make his work effective, however, his part in the program must be just as carefully planned and defined as any other activity of the health department. The "hit and miss" activities of other days were wasteful and ineffective.

The sanitary inspector should have definite objectives toward which he may work. I like to look upon the sanitary inspector as the executive for the health officer and the public health engineer; in the local health department he may be likened to the construction engineer, who takes the architect's design and specifications and builds a bridge or a modern "sky-scraper." The health officer and public health engineer study the health problems of the community; they determine which of these problems are most important and what measures must be applied to solve them and single out certain epidemiological factors to be controlled; and to the sanitary inspector is assigned the duty of applying the measures required in reaching the objective. Thus we see the sanitary inspector, in his proper rôle, not merely inspecting dairies, but undertaking to produce a safe milk for his community; not merely inspecting premises, but making it his business to see that there is a safe, sanitary means of excreta disposal and a safe water supply for every home in his jurisdiction. In the southern states we also see him carrying out a well planned program for the eradication of the malaria carrying mosquito.

Too often we have seen the sanitary inspector serving as the chauffeur for the health officer because the latter liked

to have company, or for the nurse because she could not drive a car. Or perhaps it has been convenient to have the inspector around the office to perform odd jobs and do the errands. In many health departments it is still the practice to use the sanitary inspector chiefly as a "trouble-shooter"—to answer complaints and investigate nuisances—and the health officer has no plan of work for him. Since the health department is a service organization, often dependent for its continued existence to a considerable degree upon the good will and moral support of the people, these minor complaints cannot be ignored, even though the nuisances may have little or nothing to do with the health of the community. Every health department should capitalize opportunities to render service to individuals and be pleasant about it. At the same time, the waste of effort on the investigation of nuisances should be reduced as far as possible by patiently

educating the public and creating the demand for service that gives real health protection to the community.

In my opinion, a sanitation program can be carried out successfully only when it is made a part of the activity of a complete local health organization, operating under the direction of a full-time trained health officer. The proper approach to the control of disease in every community is a study of the problems of that particular community. When the special problems have been determined and the plans have been laid, the activities of the sanitary inspector then can be directed where they will be most effective. The work of the sanitary inspector can become one of the most important parts of an essential welfare service, and such an officer may have the satisfaction of rendering a very real and necessary service to humanity if his activities are directed in the proper channels and he knows where and when to "tap."

Nutritive Value of Dried Fruits^{*}

AGNES FAY MORGAN, Ph.D.

Laboratory of Household Science, University of California, Berkeley, Calif.

THE palatability, keeping quality, and low cost of dried fruits result in their extended consumption, particularly in winter, and in parts of the world not well supplied with fresh fruits; consequently the nutritive value of these foods assumes some significance to those concerned with public health. Changes in such value brought about by the methods used in drying must be known and improvements suggested to prevent loss.

Such a research project was begun in 1927 at the University of California with the assistance of funds provided by the Purnell Act, and was continued until 1933 when it was discontinued for lack of funds. During these 6 years the main effort was directed toward the determination of the effect of various methods of drying upon the vitamin content of the fruit.

The method used was quite uniform, the Division of Fruit Products of the College of Agriculture being responsible for the procuring, experimental drying, and chemical analysis of the samples, and the Department of Household Science for the actual biological testing. In all cases fresh fruit from the same orchards was preserved by freezing storage as representative of the original condition of the fruit. Peaches and prunes of the crop of 1927, and apricots and prunes of 1928, were tested

for vitamins A and C, apricots again in 1929 and in 1930, Calimyrna and Kadota figs in 1929 and black Mission figs in 1930. Thompson seedless grapes and raisins were prepared and tested in 1931 for vitamins A, C, B, and G, as were Kadota and Adriatic figs of 1932. In addition some work has been carried on during the last year upon B and G content of peaches and apricots and a thorough study of the B and G content of commercially dried California prunes has been made. The vitamin content of Asiatic and California grown dates of known history, crop of 1930, has also been determined.

Altogether, peaches of 2 crops, apricots of 4, prunes of 4, 4 kinds of figs of 3 crops, raisins and dates each of 1 crop have been secured, dried and stored under known conditions and tested by standard biological methods for vitamins A and C, and in some cases also for B and G.

The chief questions were:

1. What proportion of each of these 4 vitamins present in the fresh fruit is retained in the sun-dried or dehydrated products?
2. What advantage, if any, has artificial dehydration over natural sun-drying?
3. What effect has the use of sulphur dioxide during the drying process upon each of the vitamins?
4. What happens to the retained vitamins during the cooking and processing of some of these dried fruits?
5. Does sun-drying develop any antirachitic activity in these fruits?

^{*} Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

TABLE I
SUMMARY OF VITAMIN A RETENTION IN DRIED FRUITS

Fruit	Amount containing 1 International unit of Vitamin A			Vitamin A retained
	Fresh	Dried	Equiv. in fresh wt.	
	mg.		mg.	per cent of amt. in fresh
Peaches (Muir)	100-160	Unsulphured, dehydrated	178	90
		Unsulphured, sun-dried	177	90
		Sulphured, dehydrated	140	100
		Sulphured, sun-dried	186	86
Prunes	100 or less	Sulphured, dehydrated	109	91
		Sulphured, sun-dried	163	61
		Unsulphured, sun-dried (commercial type)	222	45
		Unsulphured, sun-dried	232	43
		Unsulphured, dehydrated	240-420	41-24
Apricots	25 or less	Sulphured, dehydrated	49-123	20-51
		Sulphured, sun-dried	118-144	16-21
		Unsulphured, dehydrated	146	16
Thompson seedless grapes	2,000		gm.	
		Dehydrated, sulphured and unsulphured	2.0	100
		Sun-dried, sulphured	10.2	20
		Sun-dried, unsulphured	13.6	15

6. What effect has the preparatory lye dipping of prunes, raisins and other fruits upon their vitamin value?

Definite answers have been found to most of these questions as regards vitamins A and C and in large measure also for vitamin B (B_1), but not so definitely as yet for G (B_2). The technic of testing for the group of B vitamins is apparently not so satisfactory as those for A and C, although the use of pigeons in testing for the antineuritic vitamin (B_1) assists materially in that case.

It is now quite obvious that the vitamins have distinct and discoverable chemical structures, each of which has apparently no relation to that of any of the others. It cannot be anticipated therefore that any procedure or reagent should have either an equally adverse or protective effect upon all of

the vitamins; nor is it necessarily true that the same vitamin will be affected to the same degree in different fruits, since the concomitant substances which may enter into the reaction may well vary in kind and amount in the various fresh fruits.

Our findings may be summarized as follows:

1. As shown in Table I, the retention of vitamin A was 86 to 100 per cent, in all dried peaches whether sun-dried or dehydrated, sulphured or unsulphured; ranged from 60 to 90 per cent in the sulphured and from 25 to 50 per cent in the unsulphured prunes; and was lower, about 25 per cent, in the apricots.^{1, 2, 3} The vitamin A of apricots is most variable in its response to various conditions but it is extraordinarily rich in the fresh fruit and even after considerable loss is found in

TABLE II
SUMMARY OF VITAMIN C RETENTION IN DRIED FRUITS

Fruit	Method of preparation	Minimum daily dose required to protect against scurvy	Vitamin C retained during drying
		gm. (equivalent in fresh fruit)	per cent
Peaches	Fresh (frozen)	5-8	100
	Unsulphured, dehydrated, and sun-dried	up to 40 gm. tried	0
	Sulphured, dehydrated, and sun-dried	6-12	100
Prunes	Fresh (frozen)	10-20	100
	Lye-dipped, sulphured, dehydrated & sun-dried	11-17	100
	Not lye-dipped, sulphured, dehydrated & sun-dried	17-32	0 to 50
	All unsulphured products	up to 40 gm. tried	0
Apricots	Fresh (frozen) 1928 crop	up to 30 gm. tried	0
	Fresh (frozen) after evacuation, 1929 crop	10-15	100
	All products with less than 500 p.p.m. SO ₂	up to 72 gm. tried	0
	All products with more than 500 p.p.m. SO ₂	14-17	100 (compared with 1929 fresh)
	All unsulphured products	up to 72 gm. tried	0

the dried product. Morgan and Madson² showed that the vitamin A activity of this fruit is almost exactly commensurate with its carotene content, a fact also noted by Brockmann,⁴ who stated that the apricot is the richest vegetable source of this provitamin. The vitamin A of dried yellow peaches is quite uniform almost regardless of preparation, and that of prunes is only slightly affected, the unsulphured prunes retaining about 30 per cent less vitamin A than do the sulphured. However, in commercial practice sulphured prunes are but little in use.

Quite similar but as yet unpublished data have been accumulated with reference to Thompson seedless raisins¹⁰ and 4 varieties of figs.¹¹ Dehydration has been found definitely more favorable to vitamin A retention than sun-

drying, and sulphuring in nearly all cases is an additional protective factor.

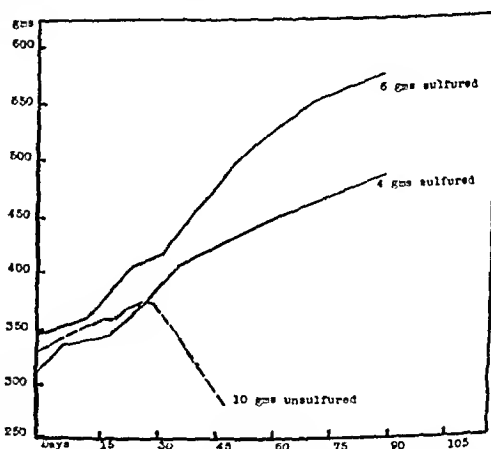


FIGURE I—Average weight curves of guinea pigs fed sulphured and unsulphured dried apricots as sole source of antiscorbutic vitamin. The daily doses are given opposite the curves. Four to 10 animals were used for each dose.

Grapes like apricots are peculiarly subject to oxidative changes, and only dehydrated raisins were found to retain significant amounts of vitamin A. Only the dark Mission figs are well endowed with this vitamin and the sulphured product retains a significantly larger amount thereof than the unsulphured, 31 as compared with 20 per cent. The variety, rather than the horticultural or drying conditions, was found to determine the provitamin A value of dates.⁷

2. Vitamin C is nearly completely lost in both sun-drying and dehydration except in the sulphured products.^{5, 6} Again the sulphured peaches were found most likely to retain the full antiscorbutic property of the fresh fruit, with sulphured prunes next and apricots least. Figures I and II represent typical experiments with sulphured and unsulphured fruit. As shown in Table III, the protective action of the sulphur dioxide was not apparent in apricots unless 470 p.p.m. were retained in the dried product.⁶ In no case was it possible to demonstrate a significant

amount of vitamin C in the dried figs, either sulphured or unsulphured, although in 3 varieties, Kadota, Calimyrna, and Adriatic, a fair amount is present in the fresh fruit.¹¹ Neither dehydration nor sulphuring was effective. There may be some unusually effective oxidative catalyst in this fruit. Similar results were found with the Thompson seedless grapes and raisins¹⁰ and no conclusions could be drawn about the preservation of the vitamin in this fruit because of its rapid destruction even in frozen storage and its low value in the fresh fruit. Dates also were negative as to vitamin C.⁷

Apparently nearly the same conditions hold for the preservation of vitamins A and C. Both are heat labile, readily oxidized and therefore protected by rapid relatively low temperature drying, that is, dehydration, and the presence of a reducing reagent such as sulphur dioxide.

3. Vitamin B has been recognized as distinct from G for only a few years. Our first systematic tests for the presence of this substance in fruits were



FIGURE II—Typical guinea pigs fed dried apricots as source of vitamin C. The animal on the left received 4 gm. daily sulphured apricot, that on the right 15 gm. daily unsulphured apricot.

TABLE III
VITAMIN B (B₁) CONTENT (BY RAT ASSAY) OF DRIED FRUIT AS AFFECTED BY SO₂

Fruit	Amount fed daily gm.	Number of rats	Initial (depleted) weight gm.	Final weight gm.	Gain or loss gm.	Period days
Unsulphured raisins	1.0	5	71	92	21	56
	1.5	26	59	93	34	56
	2.0	23	56	95	39	56
	2.5	9	74	116	42	56
Sulphured raisins	1.5	3	61	44	-17	22
	2.0	10	54	43	-21	28
	3.0	10	67	52	-15	30
Unsulphured dried peaches	1.0 or 2.0	9	64	49	-15	30
	3.0	5	78	67	-11	52
	4.0	4	69	114	45	56
Sulphured dried peaches	2.0 to 6.0	18	66	50	-16	20

made in 1931. Thompson seedless grapes and raisins were tested and it was expected that the sulphured products would show at least as good retention as the unsulphured. To our surprise almost complete destruction of this vitamin had occurred in the sulphured raisins, and quite good preservation, about 60 per cent of the original,

in the unsulphured or natural products (Table III). Similar although less clear-cut results were seen in the studies of figs, peaches, and apricots. Typical data on sulphured and unsulphured raisins examined for vitamin B activity by pigeon test are shown in Table IV.¹⁰ This outcome might have been predicted from the scattered suggestive

TABLE IV
VITAMIN B (B₁) CONTENT (BY PIGEON ASSAY) OF RAISINS
AS AFFECTED BY SO₂

No. of birds	Daily dose required for maintenance				Retention of Vitamin B of fresh fruit per cent
	Wheat germ alone gm.	Fruit		Equiv. in fresh fruit gm.	
		Type	gm.		
6	0.7-0.9	natural raisins	7	25	64
4	0.7-0.9	sulphured raisins	7 and 0.5 gm. wheat germ	76	21
3	0.7	fresh grapes	16	16	100

reports of the relative stability of vitamin B₁ to oxidation particularly in acid reaction. Its well known instability in alkaline solution is apparently not due to oxidative but to some other type of change. Protection by sulphur dioxide or other reducing agents could not therefore be predicted, but actual destruction under these circumstances was not expected. However, there are faint indications in the literature that reducing agents may break down anti-neuritic activity—for example, Levene and Van der Hoeven's finding⁸ that omitting hydrogen sulphide treatment of lead acetate saturated concentrates increased the amount of vitamin left in the filtrates. A parallel destructive effect was seen in a rice polish vitamin B concentrate treated with gaseous sulphur dioxide.¹⁰

On the whole, dried fruits are not a rich source of vitamin B, with the possible exception of unsulphured raisins and prunes. These 2 varieties are of about equal value, containing about 1 Chase and Sherman unit per gram.

4. *Vitamin G*—Our data as to vitamin G (B₂) are not adequate for the full evaluation of the effect of methods of drying. Apparently this substance is quite resistant to change and is therefore little affected by sulphuring, dehydration, sun-drying, or lye dipping. Prunes are the only fruit we have so

far tested which is sufficiently rich in vitamin G to allow a real estimation, and in this case only the commercial dried product has been used. A photograph is shown in Figure III of litter-mate rats after 7 months' test,¹² one without source of vitamin G, the other fed 2 grams of prunes daily as sole source of G.

Guha⁹ has reported recently that vitamin B₂ is not destroyed by sulphur dioxide, nitrous acid, hydrogen peroxide, ozone, nor long continued heating even under increased pressure, particularly at pH of less than 7.

The first 3 questions, namely as to the effects of sulphuring, dehydration, and sun-drying upon the 4 vitamins in various fruits, have now been answered so far as our data will allow. The fourth question, that of the effect of cooking, has been answered in detail for A and C in sulphured and unsulphured apricots.³ The same protective effect exerted by the sulphur dioxide upon vitamins A and C during drying was seen also in the open kettle cooking of the sulphured fruit (Figure IV). The loss of retained sulphur dioxide by the fruit during storage and cooking was found to be relatively great so that the product as eaten is likely to contain only traces. Commercial storage for 6 months at room temperatures and processing and re-sulphuring were found to

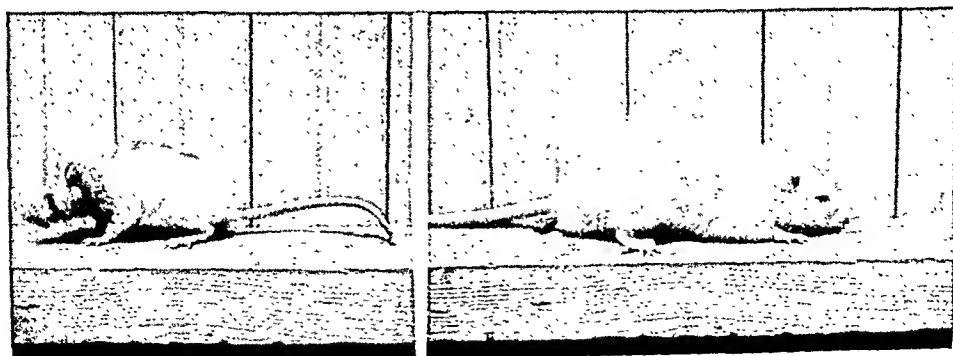


FIGURE III—Litter mate rats after 7 months on vitamin G free diet, the animal on the right having received in addition 2 gm. of prune flesh daily, that on the left no addition to the basal diet.

reduce the antiscorbutic value of the fresh fruit 50 per cent. No measurable reduction in vitamin A was caused by processing and resulphuring (Figure V).

The fifth question, as to the possible development of antirachitic activity in the sun-dried fruit, was considered in apricots and dates. Some of the dates had been sun-dried in Asia and some in California. Only traces of vitamin D were present in any of these dried samples⁷ and the sun-dried were if anything less active than the dehydrated. Another answer might be found perhaps if other samples were tested.

The sixth question, as to lye dipping, is easily answered. It was tested on prunes and raisins and the process as practised was found to be either inert or favorable to the preservation of

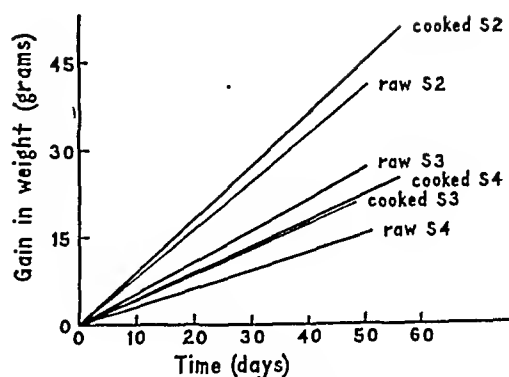


FIGURE V—Average weight increases of rats fed 22.5 mg. daily of raw and cooked dried apricots as source of vitamin A; sulphured sun-dried, S2; unsulphured, sun-dried, S3; processed, sulphured, sun-dried, S4.

vitamins A, C, and B.^{5, 6} The A and C of lye-dipped prunes were better protected by subsequent sulphuring than were the undipped, and the lye dipped raisins were somewhat better sources of both A and B than the otherwise similarly prepared but undipped fruit. The effect may be in the direction of increasing digestibility in the unsulphured fruit and increasing penetration of the protective sulphur dioxide in the sulphured fruit.

No sweeping statements can be made about any of these drying methods, because the nature of the fruit and of the vitamin concerned provides a different set of conditions in each case. Vitamin A is most adversely affected by sun-drying, particularly in apricots and raisins; it is favorably affected by sulphuring and by lye dipping. Vitamin C is largely destroyed in all fruits by any form of drying unless sufficient sulphur dioxide is present, and in that case also perhaps in figs and raisins. Vitamin B (B_1) is adversely affected by sulphuring, but less so by sun-drying than the other vitamins. Vitamin G is apparently indifferent to all the processes involved, but except in prunes is not found in notable amounts in either the fresh or dry fruits so far studied.

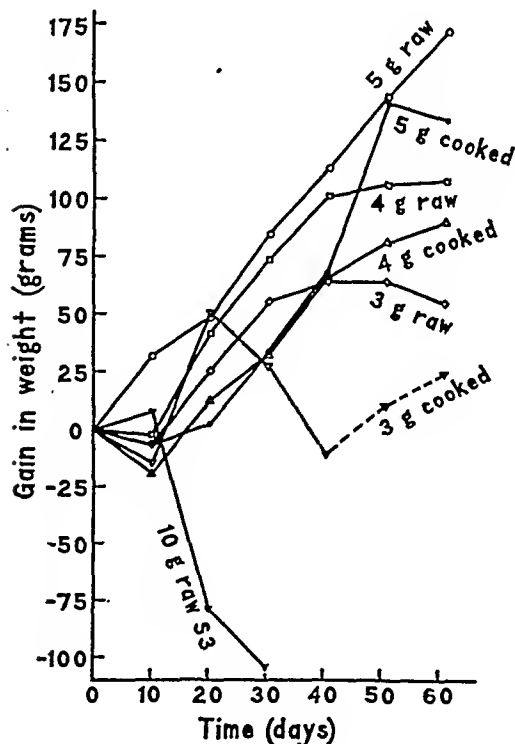


FIGURE IV—Average growth curves of guinea pigs fed various quantities of raw and cooked sulphured, dried apricots, S2 and raw, unsulphured apricots S3 as source of vitamin C.

What practical advice may be offered therefore to the producer and consumer of dried fruits? Obviously each fruit must be considered on its own merits and prepared by that method which will retain the largest proportion of its best natural endowment. Peaches and apricots should be dehydrated and sulphured to retain their excellent natural content of vitamins A and C, even though their small B content be largely lost. Raisins should not be sulphured but should be lye-dipped and dehydrated to preserve their good vitamin B and A content, and should not be counted on for vitamin C. Prunes should be lye-dipped, not sulphured, and dehydrated also since their natural endowment is similar to that of raisins. Figs which are not rich in either A or C should be unsulphured and either dehydrated or sun-dried. The black Mission figs however contain enough vitamin A to merit dehydration.

REFERENCES

1. Morgan, A. F. and Field, A. Vitamins in dried fruits. II. The effect of drying and of sulphur dioxide upon the vitamin A content of fruits, *J. Biol. Chem.*, 88:9, 1930.
2. Morgan, A. F. and Madsen, E. O. A comparison of apricots and their carotene equivalent as sources of vitamin A., *J. Nutrition*, 6: 83, 1933.
3. Morgan, A. F., Field, A., and Nichols, P. F. The effect of cooking on the vitamin A and C content of fresh and dried apricots, *J. Agr. Res.*, 46: 841, 1933.
4. Brockmann, H. Die carotinoide der aprikose, *Zeit. für physiol. chem.*, 216:45, 1933.
5. Morgan, A. F. and Field, A. The effect of drying and of sulphur dioxide upon the antiscorbutic property of fruits, *J. Biol. Chem.*, 82:579, 1929.
6. Morgan, A. F., Field, A., and Nichols, P. F. Effect of drying and sulphuring on vitamin content of prunes and apricots, *J. Agr. Res.*, 42:35, 1931.
7. Morgan, A. F. Vitamin tests on California and Asiatic dates, *J. Home Econ.*, 25:603, 1933.
8. Levene, P. A. and Van der Hoeven, B. J. C. The concentration of vitamin B₂, *J. Biol. Chem.*, 65:483, 1925.
9. Guha, B. C. Investigations on vitamin B₂, *Biochem. J.*, 25:945, 1931.
10. Morgan, A. F., Kimmel, L., Field, A. and Nichols, P. F. The vitamin content of Sultanina (Thompson seedless) grapes and raisins. To be published. *J. Nutrition*.
11. Morgan, A. F., Field, A., Kimmel, L., and Nichols, P. F. The vitamin content of figs. To be published. *J. Nutrition*.
12. Morgan, A. F., Hunt, M. J., and Squier, M. The vitamin B (B₂) and G (B₆) content of prunes. To be published. *J. Nutrition*.

Rapid Growth

. . . The philosophy which dominates the field of nutrition assumes that a young animal which grows rapidly is the ideal for maximum health both during the growing period and during adult life. This philosophy has developed under the influence of several stimulants. . . .

A third stimulus whose importance may be overlooked is that of commercial advertising. While preparing this note I selected at random one of the copies of the *Journal of the American Medical Association*, which is published weekly. More than a fifth of the advertising in this journal was devoted to fortified foods for children, chiefly for defenseless babies that are more or less easily coerced into engulfing various vitamin concentrates. It must

be possible to market such products. Who can estimate the effectiveness of such constant advertising in the journal of the American physician in creating and moulding his philosophy and his recommendations in feeding children? Is it any wonder that the pediatrician has become an advocate of rapid growth? Even the manufacturer of scales does his part by buying space in this same professional journal in order that no one shall neglect to keep his child up to date in weight. Thus has been created an enthusiasm for growth and growth stimulants. And what profit in dollars can be made from any other philosophy?—Dr. C. M. McCay and Mary F. Crowell, *Prolonging the Life Span. Scient. Month.*, Nov., 1934, pp. 405–406.

Beverage Bottling and Beer Dispensing^{*}

Covering the Everyday Problems of the Sanitary Inspector

F. E. DEGROFF

Beverage and Bottling Division, City Health Department, Los Angeles, Calif.

THE general term "bottling" includes not only glass bottles but every other container used for beverages. If new containers were used entirely there would be few problems for the sanitarian. The unfortunate practice of re-using bottles, and the source from which the second-hand bottles come, are matters of great importance to the bottler and to the public. Cleanliness and sterility of the container is necessary for the prevention of spoilage and the preservation of flavor and color of the beverage. With carbonated beverage, beer, and water bottlers, the containers are usually returned to the plant from which they came within a short time and seldom put to any other use. With wine, ginger ale, lime rickey, and several other beverages, plain bottles are used with no identification marks and no regular method of return, and these are often put to other uses.

In bottles that have been picked up by junk collectors, liquids of almost every description are found, such as oils, paint, chemicals, and drugs, often with flies and other insects, and dirt dried so hard that ordinary washing methods fail. As these bottles are returned

ultimately to some bottling plant, cleansing and sterilizing becomes of utmost concern. The larger bottling plants having mechanical equipment with the use of caustic, high temperature, sufficient time for soaking, adequate rinse, and close inspection to remove any dirty bottles, are able to obtain clean sterile containers. Even in these plants the effort to cut down manufacturing costs frequently causes them to be careless in maintaining proper caustic balance, correct temperature or renewing solutions.

The bottling trade, and the health authorities also, are much indebted to the research work of the Association of the American Bottlers of Carbonated Beverages through the Fellowship maintained at Ames College, in obtaining a standard washing formula. Legislative bodies in many states, counties, and cities have adopted the A.B.C.B. code as a law governing beverage bottling. Briefly, this requires a $2\frac{1}{2}$ per cent caustic solution at a minimum of 120° F. for a period of not less than 5 minutes. Variations from this standard may be made where a higher temperature, more caustic, or a longer soak is used. As the object is a clean, sterile bottle it is not so important that the law be followed to the letter; but in case of failure, the fact that there has been a violation of the legal requirements places a strong weapon in the

^{*}Read at a Joint Session of the California Association of Sanitarians and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

hands of the inspector to enforce compliance.

In the smaller plants, and where large bottles such as gallon and 5 gallon demijohns are handled, and machine washing is not used, hand washing with a brush and a good cleansing solution in tepid water followed by a thorough rinse with clean water, then immersion in a chlorine solution of not less than 50 p.p.m. of available chlorine, will give satisfactory results.

The essential points of plant inspection are: location of building—free from objectionable surroundings, of substantial construction, thoroughly rat-proofed and screened from insects; floors to be of cement or material impervious to moisture and sloped to a drain; rooms for preparing syrups, etc., to be separate; employees to be clean in person and habits. Samples for bacteriological examination should be taken of the water supply before and after filtering or treating, and after carbonation to locate sources of contamination. Tests for sterility of washed bottles should be made frequently. The inspector should be equipped to make tests at the plant for caustic content of wash solution, for presence of alkali in the rinsed bottle, and for the amount of available chlorine where this method of sterilization is depended upon.

It is important that the operators provide for the inspection of the bottles before they are filled and of the finished product to detect the presence of any foreign substances. In spite of all precautions, many specimens have been found on the market, or have been brought by the public to the attention of the health department, containing clothes pins, rusty nails, rubber brush tops, hairs from brushes, flies, spiders, broken glass, cork, varnish, and many other foreign substances.

Wine bottling at the winery, liquor bottling at the distillery and rectifiers or at the bonded warehouse, need little

attention, as new glass is invariably used. Many practices and methods used in wine and liquor manufacturing should be discouraged, and by the tactful suggestion of the inspector much improvement may be made.

Beer bottling at the brewery is also well taken care of with adequate equipment. However, many small concerns attempt to bottle beer, shipped in bulk to lessen transportation costs, without adequate equipment for cleaning, old bottles invariably being used with hand operated filling and capping devices. Unless there are regulations prohibiting, this will lead to many difficulties for the sanitary inspector and many complaints of spoilage from the public.

Oranges are probably the hardest of all fruits from which to obtain a fresh juice for beverage purpose without contamination by bacteria and molds from the peel. To wash in a cleansing solution with brushes, to rinse, sterilize, and dry before cutting, seems the only solution. This requires expensive equipment, time and labor, bringing the cost to a point where competition by less conscientious operators makes it prohibitive. Only by the adoption of state-wide laws can any degree of perfection be expected.

Under the present code regulations it is impossible for the fresh fruit juice manufacturer to buy fruit from the packing-house at by-product prices. This forces him to patronize peddlers who buy from growers outside the Association, consequently he gets culls of poor quality, scale infested, not processed, many picked from the ground where there is the possibility of contamination from the fertilizers used. Reports show excessively high plate counts, often *B. coli* and invariably molds. Only by the washing process can this be avoided. Such juice is usually put up in milk bottles with paper caps. The bottles and filling equip-

TABLE I
WASH WATERS AND RINSE WATERS

Date	Number	Kind	Temp.	No. Bac. per c.c.	<i>B. coli</i> (Direct)
7/31	351	Wash	...	7,600	0
"	353	Wash	...	16,900	0
"	354	Rinse	...	3,830,000	30,000
"	355	Wash	120	0	0
"	356	Wash	80	10,000	0
"	357	Rinse	80	40,000	0
"	358	Wash	...	1,200	0
"	359	Rinse	...	60,000	0
8/1	250	Wash	92	70,000	1,900
"	251	Rinse	84	2,480,000	3,700
"	252	Rinse	78	8,420,000	30,000
"	253	Wash	85	4,700	0
"	254	Rinse	115	51,200	0
"	255	Wash	85	100	0
"	256	Rinse	102	130,000	0
"	257	Rinse	98	700,000	0
"	258	Rinse	...	530,000	0
"	360	Wash	80	37,120,000	1,100
"	361	Rinse	85	58,240,000	3,200
8/2	259	Wash	120	200	0
"	260	Rinse	78	230,000	0
"	262	Wash	...	20,480,000	0

ment should be handled as in milk plants, by methods well defined in laws and ordinances covering the dairy business.

Sources of trouble in plants may be enumerated as follows:

Bottled Water Plants—Springs and wells—covering to prevent entrance of flies and other insects and birds, protection against rodents and other animals, overflow pipes to be so arranged as to prevent any possibility of back flow or flooding, methods of handling corks, sterilization of filling taps, regularity of reconditioning water filters.

Breweries—Rodent infestation around the grain and malt storage buildings and outbuildings, drainage and facilities for

flushing, loading platforms or rooms, frequent removal of all waste materials.

Grape Presses and Wineries—Disposal of waste, protection from and extermination of flies, ventilation of wine fermenting and storage rooms, floor drainage and methods and means for cleaning presses and vats.

BEER DISPENSING

The repeal of the 18th Amendment has changed the conditions covering the dispensing of drinks at soda fountains and restaurants and added beer parlors to the already numerous places for dispensing beverages. By efforts of the Health Department the methods of washing glasses and

GLASS AND DISH WASHING REPORT

	Total Insp.	Wash Water				Rinse Water			
		Hot	Warm	Tepid	Cold	Hot	Warm	Tepid	Cold
Last half of June.....	3,120	1,824	789	48	444	2,043	552	25	406
First half of July.....	1,491	726	484	157	113	1,052	246	53	99
Last half of July.....	1,129	590	304	132	65	751	217	51	55

dishes has been brought to a very high standard through the use of hot water, soap or other cleansing materials, and a hot-water rinse. In serving beer in large and heavy glasses, frequent breakage and also the desire to have a cool glass have caused the dispensers to discard the use of hot water.

This has caused a falling off in the standards for all glass washing. The report on glass and dish washing methods obtained through inspection by extra men allotted through one of the S.E.R.A. projects, is as follows: Water

was classified as "hot," being 120° or too hot for the hands; "warm" between 100 and 120°; "tepid" below 100°; and "cold" as drawn from the faucet, being below 70°.

Following this report surprise inspections were made by regular inspectors; temperatures were observed; and samples were taken. It was found that in a few instances temperatures above 100° were being used; often there was no cleansing agent; glasses were being dipped in cold water, then in a cold rinse, and the wet glasses used without

TABLE II

REPORT ON METHOD AND PRACTICE IN STERILIZING BEER AND WINE GLASSES, APRIL 24, 1934

<i>Sample</i>	<i>Sterilizing Agent</i>	<i>Cl. p.p.m.</i>	<i>Bacteria per c.c.</i>	<i>B.C. Index</i>
1225	Steri-Cl	50	1	
1226	Sanisol	15	29	
1227	Steri-Cl	10	2	
1228	" "	75	Sterile	
1229	Bicarb.	...	275,000	
1250	Hygeia	0	4,490,000	
1231	Cl. lime	100	Sterile	
2818	.....	...	11,000	Pos.
2817	Hy-Pro	70	0.0	
2819	Steri-Cl	140	0.0	
2816	H.T.H. 15	20	0.0	
2814	H.N.O.	Trace	5	
2811	?	0	18,000	
2810	?	0	14,000,000	
2813	Sal Soda	0	2,400,000	Pos.
2812	" "	...	16,000,000	
2740	Sanisol	20	2	
2754	"	100	0.0	
2815	T.S.P.	...	4,400,000	Pos.
2738	Steri-Cl	315	0.0	
2739	" "	260	2	
2753	" "	...	100	
2752	" "	...	100	
2741	" "	90	10	
2758	" "	340	100	
2757	" "	...	100	
2742	Sal Soda	...	440	
2755	Steri-Cl	100	0.0	
2743	" "	145	7	
2744	" "	140	6	
2750	" "	...	300	
2749	Cl. Lime	25	150	
2756	None	...	Innumerable	
2748	Purex	Trace	1,750	
2751	"	...	300	
2747	None	Trace	Innumerable	
2746	"	Trace	"	
2745	"	Trace	"	

being drained. Laboratory reports on wash and rinse waters in practically all cases showed a bacteria count in the millions with a positive *B. coli* index. Following these reports numerous arrests were made and convictions obtained.

The report on samples taken at the time of arrest is shown in Table I.

Note the results on samples taken with regard to the sterilizing agent used in wash or rinse water in Table II.

It will be noted that where a chlorine content of even as low as 15 p.p.m. was used, the bacteria count was 0 or very low, and where cleansing agents with no chlorine were used, the count was invariably high, with often a positive *B. coli* index.

From these reports, in addition to thorough washing in a cleansing solution, a chemical sterilizer should be required where live steam is not available, even in the case of mechanical dish washing machines. The practice of refilling glasses is objectionable and should be prohibited, because glasses are often mixed and do not reach the original user and also because the beverage drying on the glass will often affect the taste and appearance when refilled. The used glass may contaminate the faucet through the foam while being filled as it rises above the top and over the faucet.

A cooling bath (after cleansing and

sterilizing during which glasses are immersed in ice water until used) is especially to be discouraged, as tests have shown this water to be teeming with bacteria. A dry chill cabinet should be provided. Wiping of glasses with a towel is bad practice and brewery interests recommend serving beer in a wet glass. Beer when delivered in barrels should be immediately placed under refrigeration and kept at a low temperature until served. While beer distributors usually maintain a coil cleaning service, the inspector should know that such cleaning is regularly practised. Adequate toilet facilities for both sexes should be required and well maintained.

The coöperation of the brewer, restaurant and other trade associations should be solicited to raise the standard of dispensing beverages at this time as the trend is in the opposite direction, and unless earnest effort is made practices will be established which will undo much of the good that has been accomplished through years of work.

Referring again to bottling and the use of reclaimed or second-hand glass bottles or containers of any kind for any food products, legislation to prohibit their use unless washed and sterilized by standard methods, and to license dealers only when approved equipment is installed, should be urged.

Public Health Degrees Granted in 1934*

THE following tables similar to those published in previous years present the data concerning students registered in schools of public health, and the public health degrees granted in the calendar year 1934.

COLLEGE ENROLLMENT IN PUBLIC HEALTH COURSES

The number of students enrolled, and Public Health Degrees conferred in the year 1934 in courses requiring at least 1 year of residence, by American and Canadian Colleges:

Name of University	No. of Students Registered 1933-1934			Degrees Offered	No. of Degrees Granted 1934		
	Men	Women	Total		Men	Women	Total
University of California	0	13	13	A.B.	0	7	7
				M.A.	0	0	0
				Ph.D. in Hyg.	0	0	0
				Dr.P.H.	0	0	0
Columbia University	8	1	9	M.S. in P.H.	6	1	7
Harvard School of Public Health	14	1	15	C.P.H.†	6	0	6
				M.P.H.	7	0	7
				Dr.P.H.	1	0	1
Johns Hopkins School of Hy- giene and Public Health	57	15	72	C.P.H.	34	3	37
				Dr.P.H.	6	0	6
				Sc.D. in Hyg.	9	7	16
				Sc.M. in Hyg.	2	4	6
Massachusetts Institute of Tech- nology	49	9	58	C.P.H.	0	4	4
				Dr.P.H.	0	0	0
				M.S.	3	0	3
				S.B. in P.H.	9	0	9
				S.B. in San. Eng.	5	0	5
				Ph.D.	0	0	0
Stanford University ‡	0	0	0	..	..	..	0
University of Michigan	37	22	59	Dr.P.H.	3	0	3
				M.S.P.H.	6	6	12
University of Minnesota	7	2	9	B.A. or B.S.	0	0	0
				M.A.	1	0	1
				M.S.	0	0	0
University of Pennsylvania ‡	0	0	0	..	..	..	0
University of Toronto	12	4	16	Ph.D.	3	0	3
				D.P.H.	12	1	13
University of Western Ontario	0	0	0	D.P.H.	0	0	0
Wayne University College of Medicine and Surgery **	2	0	2	Dr.P.H.	2	0	2
Yale School of Medicine	7	6	13	C.P.H.	4	1	5
				Dr.P.H.	3	1	4
				M.S.	0	0	0
				Ph.D.	0	0	0
Total	193	73	266		119	38	157

* Prepared by the Committee on Professional Education

† Harvard does not give the C.P.H. as a degree

‡ Discontinued for 1934

** Formerly Detroit College of Medicine and Surgery

CLASSIFICATION OF PUBLIC HEALTH DEGREES GRANTED IN 1933

The number of persons receiving degrees by reason of public health courses taken, classified according to the nature of the degree conferred:

TABLE II

<i>Degree</i>	<i>No. of Degrees Granted</i>	<i>No. of Schools Offering Degrees</i>
Certificate of Public Health	52	4
Doctor of Public Health	16	7
Master of Science in Hygiene	6	1
Doctor of Science in Hygiene	16	1
Doctor of Philosophy	3	4
Bachelor of Science	14	2
Bachelor of Arts	7	2
Master of Arts	1	2
Master of Science	22	5
Master of Public Health	7	1
Diploma of Public Health	13	2
Total	157	

Number of Degrees conferred by American and Canadian Colleges for 1932, 1933, and 1934:

TABLE III

<i>School</i>	<i>Degree</i>	<i>1932</i>	<i>1933</i>	<i>1934</i>
University of California	A.B.	3	1	7
	M.A.	0	0	0
	Ph.D. in Hyg.	0	0	0
	Dr.P.H.	0	0	0
Columbia University	M.S. in P.H.	6	7	7
Harvard School of Public Health	C.P.H.*	4	8	6
	M.P.H.	7	11	7
	Dr.P.H.	0	2	1
Johns Hopkins School of Hygiene and Public Health	C.P.H.	33	41	37
	Dr.P.H.	5	3	6
	Sc.D. in Hyg.	12	13	16
	Sc.M. in Hyg.	1	8	6
Massachusetts Institute of Technology	C.P.H.	0	9	4
	Dr.P.H.	0	0	0
	M.S.	3	1	3
	S.B. in P.H.	9	13	9
	S.B. in San. Eng.	0	0	5
	Ph.D.	1	1	0
University of Michigan †	Dr.P.H.	3	2	3
	M.S.P.H.	17	16	12
University of Minnesota	B.A. or B.S.	..	..	0
	M.A.	1	3	1
	M.S.	1	..	0
	Ph.D.	..	1	..
University of Pennsylvania †	M.A.	4	3	0
	M.S.	..	1	0
	Ph.D.	1	1	0
	Dr.P.H.	0	..	0

* Harvard does not give the C.P.H. as a degree

† Discontinued in 1934

TABLE III
(Continued)

<i>School</i>	<i>Degree</i>	1932	1933	1934
University of Toronto	Ph.D.	..	0	3
	D.P.H.	14	10	13
	M.A.	..	2	..
University of Western Ontario	D.P.H.	0	0	0
Wayne University College of Medicine and Surgery ‡	Dr.P.H.	0	1	2
Yale School of Medicine	C.P.H.	2	6	5
	Dr.P.H.	0	3	4
	M.S.	0	1	0
	Ph.D.	6	4	0
Total		133	172	157

‡ Formerly Detroit College of Medicine and Surgery

Number of Degrees in Public Health granted in United States and Canada, 1932, 1933, and 1934:

TABLE IV

<i>Degree</i>	1932	1933	1934
C.P.H.	39	64	52
Dr.P.H.	5	9	16
M.S. in Hygiene	1	8	6
Sc.D. in Hygiene	12	13	16
Ph.D.	8	7	3
B.S.	9	13	14
B.A.	3	1	7
M.A.	5	8	1
M.S.	27	26	22
M.P.H.	7	11	7
D.P.H.	17	12	13
Total	133	172	157

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JOHN SUNDWALL, M.D.

WILLIAM P. SHEPARD, M.D., *Consultant*

Status of Standards* of the American Public Health Association, January, 1935

THE following is a list of standards of the American Public Health Association, the date of publication of the last edition and the expected date of revision. Unless otherwise stated, all standards appeared in the *American Journal of Public Health*.

<i>Standard</i>	<i>Date of Publication†</i>	<i>Expected Revision</i>
Minimum Qualifications for Those Appointed to Positions in Public Health Nursing	May, 1931	1936
Essential Features in the Design of Sanitary Drinking Fountains	1930-1931 Year Book	Under consideration
Standard Classified Nomenclature of Disease	1933—Outside Publication	1935—completed
Standard Methods for the Examination of Water and Sewage	1933—Seventh edition	1936
Standard Methods of Milk Analysis	1934—Sixth edition	1937 or 1938
Lead Poisoning, Standards for Diagnosis, Individual Treatment and Industrial Control	1930—pamphlet	Under consideration
Standards for the Design, Construction, Equipment and Operation of Swimming Pools	1930—pamphlet	No information
Standard Regulations for the Control of Communicable Diseases	1926—pamphlet 1932—(reprinting)	1935
Standard Methods for the Examination of Shellfish	July, 1922	1935
Standard Methods for the Examination of Air	January, 1917; May 1920	1935
Standard Definition of Terms Used in Sewerage and Sewage Disposal Practice	October, 1917 1927—A.S.C.E.	Indefinite
Standards for Teaching Vital Statistics	June, 1925	1935 or 1936
Report of the Committee on Salary Standards	August, 1922	Indefinite
Report of the Committee on Standard Preparation of Diphtheria Antitoxin	June, 1922	No information
Report of the Committee on Standard Methods of Examining Disinfectants	July, 1918	Indefinite
Report of the Committee on Standard Methods for the Bacterial Diagnosis of Glanders	May, 1915	Indefinite
Report of the Committee on Standard Methods for the Diagnosis of Rabies	June, 1911	1936
Report of the Committee on Bacterial Methods for Miscellaneous Food Products	November, 1917	To be dropped
Standards of Mechanical Plant Filtration	November, 1916	Under consideration
Standard Nomenclature of Causes of Death	1929—Outside publication	1939

* Prepared by the Committee on Research and Standards preparatory to undertaking necessary revisions. Members of the Association are requested to communicate comments, criticisms, corrections and suggestions for new standards to the *Chairman* of the Committee on Research and Standards, Abel Wolman.

† Most recent edition

Isolation of Streptococci from Milk*

WILLIAM M. GROESBECK

Hornell Branch, Steuben County Laboratories, Hornell, N. Y.

THE isolation of streptococci from milk frequently becomes a problem due to the presence of other bacteria. Provided that the material has been collected with the proper aseptic precautions the isolation is readily made from individual cow specimens, but in examining composite samples from producers' cans prior to pasteurization, or herd samples, the development of streptococci is often obscured by the luxuriant growth of other microorganisms.

There are several means of isolation: simple dilution of the sample, the addition of a substance to the milk to prevent growth of undesired flora prior to the cultural examination and the use of differential media.

Dilution of the sample often results in the loss of the streptococci before the extraneous bacteria become sufficiently few in number to allow the former to be detected. The use of glycerol to form a 30 per cent solution with the milk, as has been recommended for the preservation of members of the *abortus-melitensis* group,¹ has been found to be applicable also to streptococci.² Brilliant green and gentian violet have been used successfully for the same purpose.³ The great advantage in the use of these substances is that the samples may be sent through the mail exposed to room temperature without an appreciable altering of the results. By using a differential medium,⁴ an interpretation based upon the

number of colonies of streptococci present may be obtained. Such a medium usually depends upon its dye content for the inhibition of the undesired flora, and since the bacteriostatic action of dyes is often irregular the efficiency rests largely upon very careful standardization of the dye content of each lot prepared. For a similar reason it is essential that the final dilution of a dye be correct when it is added to a milk sample.

In a laboratory where a small staff and limited facilities for media making are important factors the preliminary treatment of milk samples with sodium carbonate, followed by the isolation of the streptococci upon routine blood agar,⁵ has been found to give excellent results. A 1 per cent solution of sodium carbonate has been used by other workers⁶ when only the streptococcal content of feces were desired. Adapting this technic to a similar procedure for milk, the following method has been found to be most satisfactory when composite samples or herd samples are to be examined for the presence of streptococci.

One c.c. of a thoroughly mixed sample may be used. Preferably, however, the gravity cream is removed and 1 c.c., emulsified in a test tube containing 10 c.c., of a freshly prepared sterile 1 per cent solution of sodium carbonate of tested purity. In the original method as applied to the examination of feces incubation at room temperature for 24 hours is recommended. It has been noted that if the milk-sodium carbonate mixture is placed in an incubator at

* Originally presented at the mid-year meeting of the New York State Association of Public Health Laboratories, Albany, N. Y., November 4, 1932.

37° C. overnight, growth of the streptococci (if present) occurs and Gram negative bacilli are destroyed. Following this procedure sub-cultures from the carbonate solution are made upon blood agar plates and the isolation completed in the usual manner.

REFERENCES

1. Gilbert, R., Coleman, M. B., and Groesbeck, W. M. A Study of Methods for the Isolation of *Bacterium abortus*. Pamphlet *Undulant Fever*. A.P.H.A., 1929, p. 25.

2. Gilbert, R., and Clark, M. E. The Use of Glycerol as a Preservative for Milk Samples to be Examined for Hemolytic Streptococci. *A.J.P.H.*, 23, 7:720, 1933.

3. Bryan, C. S. Preservation of Milk Samples with Brilliant Green for Streptococcus and Abortus Examination. *A.J.P.H.*, 23, 11:1182-1185, 1933.

4. Bryan, C. S. Examination of Milk for Streptococci of Mastitis. *A.J.P.H.*, 22, 7:749-751, 1932.

5. Wadsworth, A. B. *Standard Methods of the Div. of Labs. and Res.*, New York State Dept. of Health. Williams and Wilkins, Baltimore, 1927, p. 108.

6. Stainsby, W. J., and Nicholls, E. E. Technic for Isolation of Streptococci. *J. Lab. & Clin. Med.*, 17, 6:530-538, 1932.

Palo Alto Annual Report

BY the middle of February the Health Officer of Palo Alto, Louis Olsen, has released copies of his 24 page annual report for the calendar year 1934. Last year this city won first award in its population class in the Health Conservation Contest sponsored jointly by the U. S. Chamber of Commerce and the American Public Health Association.

Palo Alto is spending \$.93 per capita in its Health Department, the appropriation of which represents 3.6 per cent of the city budget. In this college town of 15,900 population there were no resident deaths from diphtheria nor

any of the other common communicable diseases. The Health Officer states that his diphtheria immunizations are done under a uniform plan followed in Santa Clara County, whereby the family physician does the immunization for a nominal sum and the Health Department furnishes the material.

In 1934 poliomyelitis was a problem on the Pacific Coast. There were 6 cases reported in Palo Alto with no death. There were reported 127 deaths from all causes in the city with a rate of 8.0. The birth rate was 10.9 which is below the 10 year average of 11.6.—H. F. V.

A Central Information Service on Current Practices of Health Departments*

JOSEPH W. MOUNTIN, M.D., F.A.P.H.A.

U. S. Public Health Service, Washington, D. C.

THE present economic depression and the attending changes in social philosophy have accelerated the adjustments in budgets and programs of health departments which normally occur in a more orderly fashion. Health administrators, more than ever before, feel the need of current information on the status and practices of health departments throughout the nation as a guide in meeting their local situations. Strange as it may seem, there has never been developed in this country any comprehensive national system for reporting data of special interest to health officials, other than morbidity and mortality. Attempts at collecting more extensive information on health administration so far have usually taken the form of periodic cross-section surveys,† except for those county health departments which are required to report to state and national contributing agencies. The U. S. Public Health Service has required fairly complete reports from county health departments to which the Service extends financial assistance, and much of the data derived in this manner

are presented annually in the *Public Health Reports*.

It is accepted as a principle by the Committee on Administrative Practice that a comprehensive system of reporting to be effective and permanent must eventually become a function of an agency in the federal government which is equipped for collecting data of this type and making the findings available. Pending the establishment of such a national reporting system, the committee felt that the resources of the American Public Health Association might be utilized for preparing the way and determining the types of information which could be obtained with relative ease and yet meet the more urgent needs of health officials. A special sub-committee, known as the Sub-Committee on Current Practices of Health Departments, was therefore appointed for the purposes just indicated.

A preliminary study was made to find a few summary measurements which would express activity and at the same time supply data for answering the more common inquiries. In analyzing the inquiries received from health officials, it was found that the information desired most frequently related to health department budgets. Next in the order of frequency were questions concerning personnel. It was also found that, when figures on budgets are extended to in-

* Abstract of Report of Sub-Committee on Current Practices of Health Departments of the Committee on Administrative Practice. The author is Chairman and the other members of the Committee are: E. L. Bishop, M.D., Louis I. Dublin, Ph.D., Allen W. Freeman, M.D., George T. Palmer, D.P.H., and John L. Rice, M.D.

† See references at end of article.

FIGURE I—CARD (FRONT) USED FOR RECORDING DATA CONCERNING
EXPENDITURES AND PERSONNEL OF HEALTH DEPARTMENTS

Name of Health Jurisdiction												
Address: State				City				Street				
Name of Health Officer												
Population Served by H.D. (19) (19) (19) (19)												
EXPENDITURES FOR FIELD SERVICE	19			19			19			19		
	Expenditure	Per Cap	% of Total	Expenditure	Per Cap	% of Total	Expenditure	Per Cap	% of Total	Expenditure	Per Cap	% of Total
Administration												
Vital Statistics												
General Sanitation												
Food, Drugs, Milk												
Child Health Supervision												
Adult Health Supervision												
Communicable Disease Control												
Tuberculosis												
Veneral Diseases												
Laboratory												
Health Education												
Public Health Nursing												
Sub Total												
Other Field Services (specify)												
Sub-total												
Grand Total Field Services												

clude amounts allocated to different services, and when personnel are reported by professional classes and time devoted to duty, these simple data constitute reliable indices by which to judge progress or retrogression over a period of years. Information on services is extremely desirable, but the collection of such data from health departments and the analysis would add materially to the cost. Furthermore, its value may be questioned since there are no generally accepted definitions for activities and no standard method for recording or reporting service items of health departments. It therefore seemed best for the present at least to concentrate attention on data pertaining to funds and personnel, and to begin the formulation of definitions which might be used later in the recording and analysis of service items.

Fortunately, data on funds and personnel meeting the requirements just set forth come to the office of the American Public Health Association each year, in connection with the Inter-Chamber City

Health Conservation Contest.* The schedule used in connection with the contest also provides for reporting a limited number of services common to health departments, but these are not being studied by the Sub-Committee on Current Practices of Health Departments at the present time.

CENTRAL OFFICE RECORDS

It must be understood that the primary purpose of this sub-committee is to assist in the development of a central agency for collecting and recording up-to-date information on health departments which might be of use to persons occupying administrative positions in health agencies. In connection with this basic function, a summary card file (Figures I and II) is kept current in the office of the American Public Health Association for all cities in the Inter-Chamber City Health Conservation Con-

* The contest was extended in 1934 to counties and rural districts having organized health departments

FIGURE II—CARD (BACK) USED FOR RECORDING DATA CONCERNING
EXPENDITURES AND PERSONNEL OF HEALTH DEPARTMENTS

EXPENDITURES FOR INSTITUTIONS AND CLINICAL SERVICES	19			19			19			19		
	Expenditure	Per Cap	% of Total	Expenditure	Per Cap	% of Total	Expenditure	Per Cap	% of Total	Expenditure	Per Cap	% of Total
Tuberculosis Hospitals												
Communicable Disease Hospitals												
General Hospitals												
Other Institutions & Clinical Serv. (specify)												
Total Institutions												
Grand Total—Field, Instit'l & Clin. Serv.												

PERSONNEL (Salaried Employees In Field Service)

PERSONNEL CLASSIFICATION	19			19			19			19		
	F. T.	Salary Range	P. T. Total	F. T.	Salary Range	P. T. Total	F. T.	Salary Range	P. T. Total	F. T.	Salary Range	P. T. Total
Physicians												
Veterinarians												
Engineers												
Sanitary Inspectors												
Nurses												
Laboratory (Technical)												
Clerks (All types)												
Other Employees												
Total												

test. It is the expectation that the number of reporting cities may be increased by other means in addition to the contest. The hope is expressed that the Sub-Committee on Current Practices of Health Departments may find its greatest field of usefulness in supplying information direct from its files to health administrators. While publication of data is only incidental to the main purpose, which is recording, certain summary reports will be issued from time to time.

A preliminary review was made of the data collected through the contest to determine changes in size of budget occurring during the years 1930, 1931, 1932, and 1933. The remainder of the report will be devoted to a presentation of a few findings.

EXPENDITURES BY OFFICIAL AGENCIES

Total and per capita expenditures through official health agencies are given in Table I. Included in this table are expenditures through official health agencies for services other than hospi-

talization, institutional care, medical relief, garbage collection and disposal, capital outlays and deficits. Expenditures by boards of education for medical and nursing services are included also, but not expenditures for physical education and health instruction. In brief, the expenditures are for services constituting the generally accepted public health program of most urban communities. These services were: administration, vital statistics, general sanitation, control of food, drugs, and milk, child health supervision, communicable diseases, tuberculosis, venereal diseases, and laboratory. Inasmuch as some cities appear in each of the 4 years of the contest while others may be entered for 1, 2, 3, or 4 years, direct comparisons of figures for 1 year with those of another therefore must be made with due caution. Furthermore, the number of small cities is not sufficient to constitute a reliable sample. Notwithstanding the shortcomings in the basic data, it seems entirely proper to make certain general observations regarding the adequacy of

funds for health services and the variation in amount from year to year.

There is a remarkable uniformity in the average per capita expenditure of the cities in all groups. Group I reports the highest expenditure; Group IV, next; and Group VI, the lowest; but the differences are very slight. The picture changes, however, if maximum and minimum expenditures by different groups are compared. While the spread between the two extremes is marked for all groups, both the highest and the lowest per capita expenditures are reported by the small cities in Groups V and VI. Attention, however, is again called to the small number of cities in the latter groups and the consequent unreliability of the sample. There also appears to have been some selection of cities in Groups V and VI with large per capita expenditures, thus distorting to some extent what is probably the true

situation for these groups as a whole. In this connection, it may be well to mention the fact that a small city reporting a high per capita budget may still have an inadequate service since fixed charges for even a minimum health organization, when distributed over a small unit of population, are certain to result in high per capita expenditures.

While the figures presented in Table I are based on accumulated totals for different cities each year, it would seem that appropriations either continued to increase or remain stationary through 1931. Some drop in appropriations occurred in 1932, but the fall was very decided in 1933. By internal economies, the health departments probably were able to compensate for the small reductions made prior to 1933, but in that year it is apparent that there must have been serious disorganization of staff and consequent impairment of

TABLE I

A COMPARISON OF TOTAL AND PER CAPITA EXPENDITURES FOR HEALTH SERVICES *
BY OFFICIAL AGENCIES † FOR THE YEARS 1930, 1931, 1932, 1933

Group	Year	Number of Cities Reporting	Population Represented	Total Expenditures	Average Per Capita Expenditure (In Cents)	Maximum Per Capita Expenditure (In Cents)	Minimum Per Capita Expenditure (In Cents)
I—500,000 and over	1930	9	8,681,122	\$7,304,295.38	84.1	117.1	41.5
	1931	8	10,173,557	9,767,642.27	96.0	125.2	61.0
	1932	9	10,552,687	9,183,987.15	87.0	100.5	41.3
	1933	9	10,710,253	7,576,869.34	70.7	118.0	36.3
II—250,000 to 500,000	1930	16	5,514,738	4,460,489.80	80.9	180.2	53.0
	1931	18	6,106,546	4,958,926.61	81.2	183.3	40.6
	1932	9	10,552,687	9,183,987.15	87.0	100.5	41.3
	1933	12	4,046,490	2,962,972.45	73.2	169.8	37.7
III—100,000 to 250,000	1930	26	3,687,963	2,808,576.22	76.2	170.4	35.3
	1931	26	3,614,393	3,068,661.15	84.9	176.2	36.2
	1932	20	2,905,684	2,293,105.03	78.9	151.5	38.0
	1933	18	2,523,295	1,892,747.90	75.0	158.4	21.1
IV—50,000 to 100,000	1930	28	1,842,596	1,499,542.31	81.4	147.6	27.8
	1931	29	1,905,001	1,550,728.78	81.4	143.6	25.4
	1932	20	1,296,450	1,014,720.30	78.3	188.8	19.9
	1933	15	1,025,118	816,851.36	79.7	144.7	35.2
V—20,000 to 50,000	1930	40	1,210,047	1,078,761.06	89.2	226.5	21.1
	1931	42	1,251,563	1,016,134.45	81.2	216.3	26.1
	1932	24	721,758	479,392.10	66.4	172.8	26.1
	1933	17	539,539	424,441.69	78.7	166.5	21.7
VI—Under 20,000	1930	53	572,737	436,453.16	76.2	181.6	10.1
	1931	50	553,001	423,899.67	76.7	199.8	10.1
	1932	26	262,357	216,196.47	82.4	186.9	10.1
	1933	19	233,064	157,052.87	67.4	189.6	23.4

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal and capital expenditures and deficits.

† Includes Board of Education expenditures, but not expenditures for physical education and health instruction by teachers.

TABLE II

NUMBER OF CITIES SUBMITTING SATISFACTORY DATA FOR TERMINAL YEARS
OF PERIOD 1930-1933

<i>Group</i>	<i>Number of Cities Accepted 1930</i>	<i>Number of Original Cities Accepted 1933</i>
I—500,000 and over.....	9	7
II—250,000 to 500,000.....	16	8
III—100,000 to 250,000.....	26	14
IV— 50,000 to 100,000.....	28	12
V— 20,000 to 50,000.....	40	10
VI—Under 20,000 . . .	53	9

service in some places at least. Other information coming to the attention of the committee suggests that this was the actual condition of affairs.

Sixty cities entered in the contest filed satisfactory reports for the terminal years 1930 and 1933. The figures were analyzed for the purpose of determining possible changes in the amount of funds available for health services studied in connection with this report. The figures for the large cities are considered more significant than those for the smaller cities because more cities of the larger population groups enter the contest and more continue to submit data acceptable for analysis. Figures substantiating this point are given in Table II. For example, 7 of the 9 original contest cities in Group I also presented acceptable data for the year 1933, but the small number of original entries and return cities in the lower population groups renders the sample extremely unreliable for statistical analysis. This again emphasizes the difficulty which is always encountered in trying to obtain information on any large number of cities below 50,000 inhabitants, and to some extent the same statement is true of cities up to 100,000 inhabitants.

The expenditures of the 60 cities filing acceptable data for both 1930 and 1933 are shown in Table III. These figures include expenditures through official health agencies for services other than hospitalization, institutional care, medical relief, garbage collection and

disposal, capital outlays and deficits. Expenditures by boards of education for medical and nursing services are included also, but not expenditures for physical education and health instruction. A very material decrease in appropriation was experienced in 1933 as compared with 1930. The percentage reduction varied from around 25 per cent in Groups I and II, to 10 per cent in Group IV. In the other three Groups—III, V, and VI—the percentage reductions were 17.3, 13.4, and 15.5, respectively. According to Table I, to which reference has already been made, 1931 seems to have been the peak year from the standpoint of expenditures for health by cities in Groups, I, II, and III. Consequently, if expenditures for 1933 had been compared with 1931, the percentage reductions might have been considerably more. In Group II, there appears to have been some selection of cities reporting low per capita expenditures for the terminal years; otherwise the cities included in Tables I and III seemed somewhat comparable. Direct comparisons, however, between the figures given in Tables I and III must be made with due caution because the same cities are not under consideration in each case. No reason can be given for what appears to be an excessive curtailment of expenditures in the large as compared with the smaller cities. It may be said in extenuation, however, that the larger cities perhaps were in better position to adjust themselves to reduced budgets by simply lessening the

TABLE III

A COMPARISON OF TOTAL AND PER CAPITA EXPENDITURES FOR HEALTH SERVICES * BY OFFICIAL AGENCIES † FOR THE TERMINAL YEARS 1930 AND 1933 (60 CITIES REPORTING)

Group	Year	Number of Cities Reporting	Population Represented	Total Expenditure	Per Capita (in Cents)	Decrease in Cents	Per Cent Decrease	Maximum City Per Capita (in Cents)	Minimum City Per Capita (in Cents)
I	1930	7	6,095,767	\$5,568,776.17	91.4	....	....	118.0	36.3
	1933	7	6,095,767	4,172,197.46	68.4	23.0	25.2	117.1	41.5
II	1930	8	2,741,979	2,092,914.40	76.3	....	....	110.0	54.8
	1933	8	2,741,979	1,606,386.24	58.6	17.7	23.2	96.5	37.7
III	1930	14	1,987,530	1,865,050.71	93.8	....	....	170.4	42.4
	1933	14	1,987,530	1,541,977.83	77.6	16.2	17.3	158.4	21.1
IV	1930	12	830,128	670,707.55	80.8	....	....	147.6	32.8
	1933	12	830,128	598,277.05	72.1	8.7	10.8	144.7	35.2
V	1930	10	342,091	350,841.92	102.6	....	....	180.3	26.1
	1933	10	342,091	303,956.96	88.9	13.7	13.4	166.5	21.7
VI	1930	9	114,720	76,126.51	66.4	....	....	181.6	27.2
	1933	9	114,720	64,338.69	56.1	10.3	15.5	189.6	23.7

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal, and capital expenditures and deficits.

† Includes Board of Education expenditures, but not expenditures for physical education and health instruction by teachers.

service, whereas the same percentage reduction in budgets of smaller cities would mean wholesale dismissal of personnel including those holding key positions on the technical staff. On the other hand, it is a source of considerable discouragement to learn that the expenditures in cities of Group II have fallen to 58.6 cents per capita which is below the figure (59.01 cents)* reported for the largest cities in 1923. Thus the goal \$2.00 per capita per annum recommended by the Committee on Administrative Practice appears to be receding, for the time being, at least.

SUMMARY

The Committee on Administrative Practice of the American Public Health Association as well as its precursor, the Committee on Municipal Health Department Practices, is deeply concerned in making available information relative to the status and practices of state and local health departments. Most of the data published so far are of the cross-section survey type assembled at in-

tervals of from 5 to 10 years. Such surveys have furnished valuable information, and should be repeated as the occasion demands, but information less detailed in character should be kept current.

A special Sub-Committee on Current Practices of Health Departments was formed to study the types of data required for answering most inquiries and the feasibility of developing a national reporting system. Schedules assembled in connection with the Inter-Chamber City Health Conservation Contest were made available for study purposes. The Sub-Committee on Current Practices of Health Departments is of the opinion that information collected on an annual basis covering expenditures by purpose, and personnel by professional classification should furnish sufficient data for answering most of the inquiries and serve as a basis for estimating progress or retrogression. The collection of such data on a nation-wide basis should not involve any great difficulty or large expense if made a routine activity of the U. S. Public Health Service. Information on services is to be desired, but its collection and analysis does not seem feasible until clear-cut definitions for

* Municipal Health Department Practice for the Year 1923, *Public Health Bull.* 164, Government Printing Office, 1926.

specific services and standard methods of reporting can be established.

From a preliminary analysis of the data assembled through the contest for the years 1930, 1931, 1932, and 1933, it appears that appropriations were maintained through 1931; in 1932 some reduction occurred; but a drastic cut was made in 1933. Budgets are rapidly approaching those reported for 1923 in *Public Health Bulletin* 164.

REFERENCES

Chapin, Charles V. *A Report of State Public Health Work*, American Medical Association, Chicago, Ill., 1915.

Health Departments of States and Provinces of the United States and Canada, *Pub. Health Bull.* 184, Government Printing Office, 1929.

Health Departments of States and Provinces of

the United States and Canada, *Pub. Health Bull.* 184 (Revised), Government Printing Office, 1932.

Report of the Committee on Municipal Health Department Practice of the American Public Health Association, *Pub. Health Bull.* 136, Government Printing Office, 1923.

Municipal Health Department Practice for the year 1923, *Pub. Health Bull.* 164, Government Printing Office, 1926.

Survey of Eighty-Six Cities, American Child Health Association, 1925.

Public Health Organization, Report of the Committee on Public Health Organization, White House Conference on Child Health and Protection, Century, 1932.

A Study of Rural Public Health Service, Report to the Committee on Administrative Practice by the Sub-Committee on Rural Health Practice, American Public Health Association, The Commonwealth Fund, New York, 1933.

NOTE: Additional articles dealing with expenditures by functions and personnel according to major professional classifications will appear in subsequent issues of the *Journal*.

Lead Poisoning in Czechoslovakia

THE Czechoslovak Ministry of Social Welfare has recently circulated to the other departments a draft Bill for the purpose of excluding women and young persons under 18 from employment in certain processes in the treatment and handling of lead and zinc. The Bill also lays down certain conditions to be observed in regard to the employment of adult male workers in such processes:

The operations from which women and young persons under 18 are excluded are those enumerated in the Lead Poisoning

(Women and Children) Recommendation, 1919, and the restrictions to be imposed relative to employment of adult male workers in these processes are those prescribed in the Recommendation for women and young persons where their employment is permitted in processes involving the use of lead compounds, with the addition of more detailed requirements as to the state of the workrooms, lighting and ventilation, methods of cleaning and protective clothing.

The Bill also provides for medical examination on engagement and rejection of the unfit.—*Indust. & Labour Inf.*, LIII, 5 (Feb. 4), 1935.

EDITORIAL SECTION

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SHALL MARRIAGE COUNSELLING BECOME AN AMERICAN PUBLIC HEALTH FUNCTION?

BY marriage counselling we understand such advice by medically trained persons, and others with legal and social or psychological competence as is sought by men and women, unmarried or married, who believe that their lives together will be happier and wiser if they learn, before rather than after they have met conflict and suffering in marital sex relations, what medical and social experience has gathered and can legally impart to them. By the term "public health function" we refer to the authorized and tax-supported use of official health agencies under the police power of the states or under federal government, for the promotion of health, the prevention of sickness, and the postponement of death.

From Aroostook County, Me., to Los Angeles, Calif., physicians, nurses, and health officers are engaged in the preliminary experiences with their communities, with religious sects, and with appropriating bodies of local government in the matter of contraceptive advice.

There are now in operation in the United States, including Hawaii and Alaska, 157 marriage advice centers, of which 18 are controlled and served by the local public health authority. Twenty-six of the states have one or more of such centers, and in the case of 4 (Michigan 12, Pennsylvania 19, California 29, and New York 32), they are numerous and fairly distributed according to population. Thirty-five of these stations of medical and health information are in hospitals, the remainder being apart from any agency for the organized care of the sick.

Up to the end of 1934 not less than 200,000 women have sought and received advice at such centers, or 1 for each 100 women of childbearing age in the population. The ratio of marriage advice stations to population is one to each 400,000 in New York City.

The 3 stations in the rural area of Aroostook County, Me., established since August, 1934, with the approval and financial assistance of Town Managers and Selectmen, with the endorsement of the local medical profession, and associated with home visits by the district nurses, served 161 patients in the first 10 weeks.

The issuance of *Circular No. 1408*, May 31, 1934, by the Ministry of Health of Great Britain to Local Health Authorities, constitutes the latest episode in a history of progress in liberal social use of medical knowledge, beginning with the activities of the Malthusian League (1877-1914), and carrying on through the Women's Coöperative League (1923); the memorandum of the Ministry of Health (1924); Dame Janet Campbell's *Report on Maternal Mortality*, 1924; a resolution of the House of Lords favoring distribution of birth control advice among the masses (1926); approval by the Bishops of the Church of England of birth control (1930); the memorandum No. 153 M.C.W. by which the Ministry of Health allowed local health authorities to furnish birth control information to women attending local child and maternal welfare centers (July, 1930); and the *Final Report of the Departmental Committee on Maternal Mortality and Morbidity* (1932), which specifically recommends the giving of contraceptive advice to women on certain medical indications.

The latest circular (No. 1408) carries into effect by the option of the local health officer, and by public funds, the opinion of the Ministry of Health, that it is proper to offer contraceptive advice to married women suffering from illnesses which are detrimental to them as mothers, discretion as to what is or is not medically detrimental being left to the physician in charge of the clinic.

Careful, thorough, progressive, democratic, competent English leadership in the field of public health has in this matter included birth control information as an approved function of clinics devoted for many years past to practically all other phases of maternal and child health guidance.

In Germany, first in 1905, in voluntary agencies, and later in health offices, schools, hospitals, and churches, marriage counselling has been undertaken by the coöperative skill and training of physicians, lawyers, and persons with social and psychological training.

Evidence of the socially eugenic effect of the educational and technical service offered at the marriage advice bureaus of Germany, appears in the changes in the birth rates of 4 economic classes, for instance in Bremen, from which city the following data are obtained:

	<i>Birth Rate per 1,000</i>		<i>Per Cent Change</i>
	<i>1901</i>	<i>1925</i>	
Among families of the well-to-do	12.7	14.7	+ 15
Among families of the middle class	28.9	14.2	— 51
Among families of laborers	43.7	19.5	— 53
Among families of the poor	46.2	18.9	— 60

It would appear that the less competent but usually more prolific fraction of the population reduces its birth rate more than do the economically more favored groups. Similarly in France where contraceptive information has long been generally available, without legal sanction, there is a tendency of birth rates among all classes to approach equality.

	<i>1906</i>	<i>1930</i>	<i>Per Cent Change</i>
Birth rate among well-to-do in France	12.3	16.3	+ 32.5
Birth rate among the poor in France	22.9	16.6	— 28.3

With a marriage rate in the United States today of about 8 per 1,000, with 1 in 6 marriages ending in divorce, with at least 1 abortion for each 3 pregnancies, with 15,000 maternal deaths a year from criminal abortion, and a large amount of maternal mortality related to conditions in one or both parents of a preventable character, and with disproportionally high birth rates among the less competent

part of our population, we may well consider whether there are not lessons for us to learn and apply in the example of some European nations which, like England, Germany, Holland and the Scandinavian countries, have incorporated the protection of women against pregnancy by appropriate medical advice in their public health services.

Federal laws of the United States today forbid transmission of contraceptive information through the mail, even the addresses of marriage advice stations, or transportation of supplies for contraceptive purposes by express companies or other common carriers, or possession of articles intended for contraceptive purposes. The archaic laws of 1873 include contraceptive advice under the head of obscenity. Federal laws conflict with the state laws. Physicians legally giving contraceptive advice in a state have to bootleg supplies and educational material for their patients or go without. Commercial exploitation of fraudulent materials and measures is widespread.

The bugaboo of religious intolerance of medical advice for contraceptive purposes can no longer be honestly quoted in the face of publicly declared positions of a number of important organizations* which have expressed a favorable attitude toward the dissemination of birth control information under appropriate conditions.

It would appear that the public health profession in the United States has not only an opportunity but an obligation to make available through prenatal conferences, in maternity and baby and child health centers and through appropriate educational channels, under strictly medical control, such advice and guidance, including the teaching of safe and effective methods of contraception, as will preserve the physical and mental health of the family and in particular of the mother of living children. If there were no other good reason for the educational service of a marriage advice bureau, the necessity of warning women against the mechanical and chemical damage of many of the exploited and untrustworthy contraceptive devices should suffice.

The medical profession and the officers of health throughout the nation should be relieved of personal and official embarrassment in meeting their professional obligations, by repeal of much or all of the existing prohibitory federal and state laws affecting the giving of contraceptive advice, which at present are either disregarded or remain in disrepute and contribute to dishonesty, confusion of conduct, and commercial fraud.

Contraceptive clinics and marriage advice bureaus will doubtless continue to increase in number and patronage. It would be wiser to direct the demand toward professionally competent official agencies than to permit expansion and exploitation through those less qualified.

For authentic sources of information in this field the following brief list of references is offered:

- Medical Aspects of Human Fertility.* Publication of the National Committee for Maternal Health.
 Dickinson and Bryant. *Control of Conception.* Williams and Wilkins, 1931.
 Sanger and Stone. *The Practice of Conception.* Williams and Wilkins, 1931. Reviewed *A.J.P.H.*, Aug., 1932, pp. 885-6.
 Kopp, Marie E. *Development of Marriage Consultation Centers as a New Field of Social Medicine.* *Am. J. Obst. & Gynec.* XXVI, 1 (July), 1933.

* The Universalist General Convention, 1929; the Central Council of American Rabbis, 1929; the Lambeth Conference of Bishops of the Church of England, 1930; the Federal Council of Churches of Christ in America, 1931; the General Council of Congregational and Christian Churches, 1931; the New York East Conference of the Methodist Episcopal Church, 1931; the Philadelphia Yearly Meeting of Friends, 1931; the Y.W.C.A. National Board, 1934.

LETTER FROM GREAT BRITAIN

THE RETURN OF PROSPERITY

The press here for some time has been announcing that trade and everything else is better, and the fact that the income tax was reduced may be taken as evidence. More definite evidence has been the prodigality in entertainments during the later months of 1934, and the extraordinary density of the shower of greeting cards and gifts that fell upon practically everyone round about Christmas time.

So far as entertainments were concerned, even members of the public health service were affected. The annual dinner of the Society of Medical Officers of Health itself, for example, appeared more lavish than usual, if in nothing else in the matter of speeches at any rate. To an extent this was because the occasion was chosen for having certain members as guests of honor, on account of the value of the services rendered to the society, its members, and the health service generally. Prominent among these guests was Dr. George F. Buchan, well known to public health workers in the United States as an Honorary Fellow of the American Public Health Association and for other reasons. The toast of the guests of honor was proposed by Sir John Robertson, Professor of Public Health in the University of Birmingham and formerly Medical Officer of Health of that city.

On the evening following the dinner there was a reception to, among others, representatives of the Society of Medical Officers of Health at the Hall of the Society of Apothecaries. This was something in the nature of an event and a very great honor, and was accorded largely because the Master of the Society of Apothecaries is Sir George

Buchanan, until recently Senior Medical Officer at the Ministry of Health.

The Society of Apothecaries is one of the City of London Companies, being an off-shoot of the Grocers' Company, one of the most ancient, wealthy, and prominent of these institutions. Practically all of these companies concern themselves with education in some shape or form. The Grocers' Company, for example, has endowed a school for boys, and annually grants a number of scholarships for medical research. The Apothecaries Company is, naturally, interested in medical education, and in addition to granting qualifications to practise medicine, following examination, also examines candidates for and grants special qualifications in obstetrics and gynecology. The Hall of the Society is one of the old buildings of the City and includes a number of interesting apartments in addition to the beautiful Hall itself, which is used for, among other purposes, banquets—invitations to which are greatly valued—receptions and so on. The Society possesses many pictures and much furniture, plate, and relics of great intrinsic value and immense historical interest. Also they have a very fine cellar and recipes for special beverages dispensed on important occasions such as this of which I write, when Sir George Buchanan, supported by his "wardens," Sir William Willcox, the well known medical jurist, and Dr. Fairbairn, Chairman of the Central Midwives Board, received members of the public health service as guests.

PUBLIC HEALTH REPORTS

With the appearance of Sir George Newman's *Report on the Health of the*

School Child, early in December, was completed the series of government health reports for the year 1933, in which health officers are particularly interested. The others are, of course, the report of the Ministry of Health, which always comes first, and the report *On the State of the Public Health*, which is Sir George Newman's report as Chief Medical Officer of the Ministry of Health. In *The Health of the School Child*, he reports as Chief Medical Officer of the Board of Education, the first government post, by the way, to which he was appointed. The report of the Ministry of Health covers a review of the whole field of work operated by the department, the subjects dealt with falling under the main heads of Public Health, Housing and Town Planning, Local Government and Local Finance, Poor Law, National Health Insurance and Contributory Pensions. It is no doubt because the matters to be discussed are so numerous and so diverse that the Chief Medical Officer of the Ministry makes an individual report which appears as a separate volume. In regard to public health, the report shows that the activities in relation to sanitary matters and the health services generally throughout the country were well maintained.

HOUSING, TUBERCULOSIS, ETC.

Water supply was troublesome in certain parts on account of the drought, but by means of increased loans, amounting in all to over three millions sterling, the Ministry sought to help authorities making provision of supplies. A note in regard to the special survey of health services now in progress shows the Minister of Health satisfied with the provision made by the local authorities. Similarly satisfaction is registered following the review of the work done during the year in relation to the working of particular welfare or disease prevention schemes and so on. Provi-

sion for dealing with tuberculosis continues to grow, and very full use is made of the various sanatoria and other institutions provided by local authorities and otherwise. Special mention is made of the work done at Papworth and other village settlements.

In relation to maternity and child welfare also the work of local authorities continues to develop steadily. The infantile mortality rate for the year was 64, the rate of maternal mortality being 4.32 (1.75 for deaths from puerperal sepsis, and 2.57 for deaths from other causes). The total rate in 1932 was 4.04, and in 1931, 3.94. In relation to housing, slum clearance and the provision of new houses are shown to be progressing actively. Exclusive of houses built for re-housing purposes in connection with slum clearance, over half a million were built in 1933-1934. The total annual contribution from public funds to housing is shown to be about 16½ millions sterling.

NATIONAL HEALTH INSURANCE

Poor law and national health insurance work received close attention during the year. In 1933-1934 the average numbers of persons in receipt of institutional and domiciliary poor relief were respectively 185,457 and 1,139,546, a total of 1,325,003, representing 330 per 10,000 of the population. For assistance to distressed areas throughout the country, a special grant of ½ million pounds was voted by Parliament. As indicating the extent of the insurance medical services in England alone in 1933, it is noted that 15,500 doctors were in insurance practice; that medicines, etc., were supplied as part of medical benefit at about 10,200 chemists' shops, and that the number of insured persons entitled to medical benefit was approximately 15,150,000. The cost of medical benefit was just under 8½ millions sterling, of which over 6 millions went to pay insurance

doctors for their services — services which, though it is not in terms stated in the report were greatly appreciated, were of the greatest advantage to the great part of the insured population, and resulted in many cases in securing medical assistance that, in the absence of the scheme, would have lacked it. In his own report (*On the State of the Public Health*), Sir George Newman devotes a section to the insurance medical service, and though he makes no sounding claims as to its excellence, stresses the fact that complaints against doctors are year by year very few; numbering in 1933 no more than 203.

EFFECTS OF UNEMPLOYMENT

In other sections Sir George discusses the situation in relation to such matters as epidemiology generally, tuberculosis, maternity and child welfare, cancer, and so on. Sociological questions also, as usual, receive a great deal of attention, and as he was almost compelled to do so he has much to say on unemployment and the economic depression and their effect on the health of the nation generally. Always his view has been that, in spite of the adverse conditions in regard to employment, the state of the public health and nutrition cannot be shown to have been affected in any degree. This opinion he reiterates and backs with statistics and the evidence of medical officers of health and others in particular areas. In his report as Chief Medical Officer of the Board of Education (*The Health of the School Child*), he refers again, as follows, to the subject:

The indisputable evidence of the national morbidity and mortality rates, of the health insurance returns, and of the school medical

service for 1933 indicates quite definitely that the general health and nutrition of the population of England and Wales, taken as a whole, was well maintained in 1933, in spite of economic and social difficulties, distressing as these have been. . . . There can be no question that the nutrition of the English people is better today than at any past period of which we have record. . . . From the returns of the local education authorities for 1933 it is evident that whilst some schools find undernourishment is present, and has even increased in certain areas or particular groups of school children, it is not generally more prevalent than in recent years, in spite of the economic depression and the mental distress and hardship following in its train. This circumstance is due to the increased care and devotion of the mothers and teachers, to manifold forms of voluntary service, and to the public provision of insurance benefit, school feeding and medical supervision.

Sir George Newman's reports are always scholarly and readable. He writes with conviction, and because it is not always merely as an official setting forth facts and information with regard to which there can be neither question nor dispute, or as a scientist that he writes, but as a humanitarian and a sociologist as well, there is never the feeling that it is with so many figures of people or school children he is dealing, but with living beings who have had a past that may not have been too happy and healthy, and are having a present and will have a future that he is trying to insure shall be better and happier and healthier. In both the school and the general report for 1933 there are many sections in which these things are shown, and I wish very much I might have been able to do more than merely refer to the fact of the existence of the volumes.

CHARLES PORTER, M.D.

London

PUBLIC HEALTH EDUCATION*

Dates Ahead—In March, 1877, a "visiting nurse first started her rounds to sick poor"; St. Patrick, "credited with driving the poisonous reptiles out of Ireland," whose birthday may be applied to the medicine fakirs of today; National Negro Health Week opens in March, 1935.

April Fool's day offers a lead against fakirs and superstitions; the first dispensary opened in April, 1786; National Youth Week closes April in 1935, and leads into Child Health Day.

The above are samples of dates to be used to give timeliness to health publicity. Additional information and dates running throughout 1935 are to be found in "News Almanac for Social Work—1935," edited by Louise Franklin Bache who had charge of health education in the Health Department during the Syracuse Health Demonstration. Of course there are many dates and ideas for nearly all forms of social work, but a goodly proportion may be utilized by health agencies.

Single copies, 50 cents. Address: Community Chests and Councils, 155 East 44th St., New York, N. Y.

Write to Dr. R. C. Brown, U. S. Public Health Service, Washington, D. C., about Negro Health Week; National Youth Week Committee, 211 W. Wacker Drive, Chicago, Ill.; American Child Health Assn., 50 W. 50th St., New York, N. Y., about National Child Health Day.

Testimony from the Advertisers—Last year there were vociferous

applauders of the purity of food and patent medicine advertising and manufacture. But in recent months the full and complete answer could be gleaned from extracts from articles in advertising journals and reports of advertising conventions. When talking among themselves there has been abundant testimony during the fall and winter to the need of legislative control, unless we accept the optimistic view that industry can and will do a thorough cleaning up job.

For information about present and proposed food and drug laws address U. S. Food and Drug Administration, Washington, D. C.

The Red Cross Is Criticised—In *American Mercury*, Nov., 1934, appeared a scathing criticism of the American Red Cross. The extreme insinuations were such as to raise doubts in the mind of a thoughtful reader, but many supposedly factual statements had an appearance of accuracy.

Doubtless the Red Cross, as a very human institution, is imperfect and inefficient here and there. *But the most striking criticisms in the Mercury article are characterized by the Red Cross as gross misstatements of fact or of interpretation.*

A brief criticism, signed by Paul U. Kellogg, appeared in *Survey Monthly* (112 East 19th St., New York, N. Y.), Dec. 15, 1934. A more complete answer is *Red Cross Operations*, a pamphlet issued by the American National Red Cross, Washington, D. C. Copy free.

Because of the public health activities of the Red Cross, public health

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

workers will wish to know the truth about this magazine article.

The Need for Economic Security—Twelve silhouette charts tell the story in "The Need for Economic Security," a publication of the Committee on Economic Security, Washington. "The annual accident toll" and "Illness among persons in families of varying economic status" directly concern our readers, but most of the diagrams have striking implications for those interested in medical services and the economic factors affecting the health of individuals.

Here is material for lantern slides, for bulletin boards, for reproduction in house organs, as illustrations for newspaper stories, for large scale platform illustration, as the basis for staff and outside group discussion. And they illustrate how much statistical material may be made graphic.

Address: Committee on Economic Security, Washington, D. C. Copies free.

Health Education in January Journal—In *American Journal of Public Health*, Jan., 1935, appeared the following in "Reduction of Maternal and Infant Mortality in Rural Districts":

One of the important functions of a health officer, who is determined to lower the maternal and infant mortality rates in a rural area, is to develop active and efficient lay support of his undertakings. His personality and his ability to interest the public in his child health program may determine his success or failure in this field. This matter of organizing groups of influential citizens to further a community program in behalf of mothers and infants should be given more emphasis in our schools of public health in addition to the many technical and scientific subjects the embryo health officer is expected to master. (Followed by discussion of the organization of interested lay groups.)

Under "The Ninth Pan-American Sanitary Conference" it was stated that

In connection with venereal disease educational measures were advocated . . . and especially the necessity for greatly increased popular health education was discussed.

But most important of all was the editorial, "Medical and Scientific English," on page 85. That editorial, we hope, will be re-read by all who see this paragraph.

The editorial could be used in a number of ways to contribute toward better health education.

Why not reprint most of it in every national and state journal and bulletin?

Why not supply mimeographed or printed copies to all staff members who talk or write or handle correspondence, and to all who write for any of our periodicals?

People Do Read—The American Library Association reports a decrease in the reading of fiction, with continued popularity of books on economics, political and social sciences, among others, as well as a steady interest in success books and occupational works. Could we increase the reading of books on health, the human body and its physical environment by making more of the success phase of health? "Fiction Reading Decreases" (*Publishers' Weekly*, 62 West 45th St., New York, N. Y., Jan. 5, 1935), and "Who Reads What—and Why" (*Nation*, 20 Vesey St., New York, N. Y., Jan. 23, 1935) give some of the facts about readers and reading.

A Newspaper Campaign Reduces Accidents—San Francisco reports success in contrast with the Los Angeles testimony of failure (see this department for Jan., 1935, page 93) in crusading against auto accidents.

Editor and Publisher reports the campaign conducted through 1934 by the *San Francisco News*, crediting it with

. . . a fatality decrease in San Francisco of 14.5 per cent over 1933, while California

and the country as a whole registered an increase of 15-plus per cent. Oakland, across San Francisco Bay, the nearest neighboring city, registered an increase of 38 per cent. The Los Angeles auto death rate per 100,000 population was almost twice that of San Francisco.

These definite results have inspired the *San Francisco News* to plan a continuous campaign during 1935 that will be even more effective.

The plan for 1934 called for "at least one story on safety every day." Actually,

. . . the result was an average of from two to three stories a day, besides scores of illustrations, editorials and cartoons during the year.

For some of the details see *Editor and Publisher*, Times Bldg., New York, N. Y. Feb. 2, 1935. 10 cents.

It Never Was Stopped—The December, 1934, issue carried this paragraph:

The *Monthly Bulletin*, Indiana Division of Public Health, Indianapolis, has been revived under the editorship of Thurman B. Rice.

It never has stopped publication. It merely failed to reach this editor for a period of months. This illustrates how easy it is to misstate the facts without a direct check-up.

A Housing Exhibit for Your City—An unusual Housing Exhibit was shown recently at the Museum of Modern Art, New York City. This display, presented in modernistic fashion, deals with the broad aspects of housing. It is available for other communities. Address Lyman Paine, New York City Housing Authority, 10 East 40th St., New York. Early application is desirable to avoid conflicting dates.

Joint Health Education in New York City—The bigness of New York City seems appalling when a community health education effort is being planned. But the Welfare Council, through its

Health Education Section, has undertaken to focus the activities of health agencies upon a series of monthly topics making each educational effort go further through combining forces. No extra funds will be available, as were expended in the diphtheria campaign, and efforts must be avoided which might lead to new demands upon clinics or nursing services.

The 1935 topics will be as follows:

February—Congenital syphilis; *March*—Heart diseases, Diphtheria and communicable diseases; *April*—Early treatment of tuberculosis; *May*—Maternal and child health, Dental and oral hygiene; *June*—Nutrition, Summer care of children; *July*—Safety and accident prevention.

In the Great Smoky Mountains—"Thoughts on Nutrition and Health in the Mountains," after describing conditions says:

The problem of diet in the mountains is partly economic but not wholly so, for we sometimes observe people in good condition so far as economic status is concerned, who do not have proper diet. I feel convinced that the real solution of this health problem is to be found in education. . . . But it will require the coöperative efforts of doctors, public health nurses, vocational agriculture and home economics teachers, county agents, home demonstration agents, and others, for a long time, to carry through this program of education.

By Dr. R. F. Thomas. *Mountain Life and Work*, Berea, Ky. Jan., 1935. 30 cents.

Health Education in India—In the annual report of the Bombay Branch of the Baby and Health Week Assn., Bombay, India, we find a picture of "a stall in the Foods and Vitamins Exhibition arranged at Byramjee Jeejeebhoy Home of the Society for the Protection of Children in Western India, at Matunga." There is described a "scheme of health propaganda" submitted to the Director of Public Health and the Surgeon General, at Poona.

Free cinema shows, lectures with magic lantern slides, and the exhibition of models showing by contrast measures that improve the condition of the villager and those that are lowering it at present are the chief items with which my association has carried on propaganda for the last 8 years with remarkable success. Such demonstrations have necessarily to be followed by some permanent measure for his relief such as the improvement of village water supply, removal of dirt from the village, training of Dais and their supervision, etc. But the Exhibitions and Cinema Shows help the welfare worker a great deal in dispelling superstitions and securing the voluntary coöperation of the villagers.

Preparation for Better Service—

In February a 1-week institute for tuberculosis workers was held by Massachusetts Tuberculosis League in Boston, with Philip P. Jacobs in charge. Prof. C. E. Turner presented adult health education and school health education.

An Institute for Tuberculosis Workers is being held in the first 2 weeks of March, 1935, by National Tuberculosis Assn., and New York University, with Philip P. Jacobs, Ph.D., conductor. Several sessions will be devoted to adult and child health education.

Home Hygiene Instructors' Institutes will be held in a number of states by the American Red Cross. The Home Hygiene Service conducted 26 Institutes in 1932-1933, and 45 in 1933-1934.

"Dental Health Education," by J. M. Wisan, D.D.S. Describes an extension course for teachers and nurses conducted by Newark, N. J., State Normal School. *Child Health Bulletin*, American Child Health Assn., 50 W. 50th St., New York, N. Y. Jan., 1935.

Calgary, Uganda, and India Prize Winners—Annually the National Baby Week Council, London, England, makes a series of awards for the best Baby Week Campaigns held in British Empire outside of Great Britain.

First prize in 1933-1934 went to the

Calgary (Canada) Council on Child and Family Welfare.

Second place went to Kampala, Uganda, for

... an extremely good campaign, which followed very much the same lines as those adopted for such campaigns in this country (England), though it was adapted with great skill to meet the problems presented by a native and often illiterate people. A wonderful baby show was held during the Week, for which 72 African babies and 100 Asiatic babies were entered, and a particularly forceful event in the programme was the Infant Welfare and Public Health Exhibition, which attracted more than 75,000 people.

The third award went to Mysore, India, with additional awards to points in India, Ceylon and Africa.

For additional information see *Mother and Child*, 5, Tavistock Square, London, W.C.1. Sept., 1934. 9d.

Hygeia for February, 1935—Material for speakers and writers and for reference, in *Hygeia*, 535 N. Dearborn St., Chicago, Ill. (free copy to health workers):

New food and drugs legislation. Undulant fever—then and now (with good picture diagram on pasteurization). A heart-to-heart talk about hearts (a radio talk). Preventable diseases in the Washington family (history for popularization). The challenge of the slums (new housing possibilities). Science and health and the key to the crime wave (cartoon by Ding). Experimentation and medicine: man's debt to the animal world. Occupational diseases of musicians (more of them). "Occupational diseases" of children (a second lot). Health education in Arizona (a project already 7,000 miles long). The clothes moth (the 9th parasite). The golden age of prevention (about teeth). The eyes in infancy and childhood. Exploding a sinus fallacy. Old Boston school days (more usable history). The A.M.A. and tomato juice. New books on health. Questions.

For teachers and others: Healthy children—the teachers goal. The report card comes home (mental hygiene). Enjoying trips to the dentist (a story of genuine achievement). Fruit goes up a point (in a high school lunch room). New health books for teachers and pupils.

A.M.A. radio programs, too late for listing

here, but announced for NBC network on Tuesday at 5 p.m., E.S.T., and Columbia network, Thursday at 4:30 p.m., C.S.T.

Learning on the Job—A number of round tables have been offered by the New York Social Work Publicity Council for these groups:

Those who wish to learn about methods and materials

Those who have specific questions or special needs

Those who wish to think out and talk over technic or principles and philosophies

Wherever two or more health workers may get together to talk over such topics as are offered in New York, it is likely that health education will benefit. Also, there is a widening of experience and information where the health workers may join with workers in other social welfare fields.

One of the simplest and most effective means for learning on the job is to talk over and think out with others the basic technics.

The Social Work Publicity Council will be glad to share ideas and outlines with anyone who will get together with at least one other person to discuss any of the topics which follow.

Amateur movies: What practicable values do amateur movies offer to social agencies in or near New York City? how inexpensive they are? how to get them?

Annual reports: The uses of annual reports and how to fit them to those uses.

Broadcasting: The philosophy of health and welfare broadcasting, and its practical application, including the critical examination of proposed plans and materials.

Health education for adults: An exploratory group: What is health education? What are the particular problems in conducting effective health education in New York City?

Making ideas and statistics graphic: On making reports, plans, statistics, etc., interesting and clear to board members, committee meetings, general audiences, and in publications.

Meetings: The reduction of meeting or conference overhead of social worker groups; the improvement of quality and value. If this year you will arrange or lead or speak at

or attend even a single meeting, small or large, this group will serve you.

Mimeograph and other duplicating processes: About more and better use of duplicated material, and better duplication.

Newspaper releases: *Limited* to those who will submit releases for friendly comment and constructive criticism by the group and the guest clinician.

Photography in social work: How we may get better service from professional photographers; where the amateur may serve; new types of photographs "instead of the same old stuff."

Printed matter clinic: Samples of printed matter or of copy for printed matter will be submitted for friendly criticism by the group and by invited clinicians. *Limited* to those who will submit samples for review.

Statistical data for publicity use: Kinds of data having publicity value; what annual or quarterly statistics can be used to advantage; what general or governmental data may be of value; collecting data primarily for publicity; channels for use.

Volunteers in publicity: To explore the practical possibilities in publicity service of various types by volunteers. Open to volunteers, executives, publicity workers.

Window displays and other exhibits: Planning and preparation of window displays and other exhibits; to include consultation sessions with a display man, photographer, etc.

For copy of the full list with other details send 3 cents postage to Social Work Publicity Council, 130 East 22d St., New York, N. Y.

Wanted for Awards—Descriptions of successful projects in health education will be considered by the Awards Committee of the Social Work Publicity Council, 130 E. 22d St., New York, N. Y., in making selections for the annual citations for merit. These must be received before April 1.

Wanted for Milwaukee—What ideas have you for development at Health Education and Publicity Headquarters? What display could you set up? What display idea would you illustrate?

Early collaboration will add interest and value to the center at the A.P.H.A. meeting for those concerned with health education.

Wanted for the JOURNAL—We are sure that much good and useful health education material issued by local, state, and national health agencies does not reach this department of the JOURNAL.

Will the health officer or the association executive or the supervisor of health education, or whoever is in authority, please designate some member of the staff to be responsible for sending copies of material already issued in 1934–1935, also new material issued during the remainder of 1935?

Wanted by the Editor—Have you prepared an amateur movie on health education? Have you used marionettes or puppets?

EXHIBITS

The Southern Medical Association gave an award to Texas Dept. of Health for its exhibit of Texas malaria control. The exhibit was almost wholly of well labeled objects.

"A Hospital Stages Its Own Historical Exhibit" describes an exhibit put on by St. Peter's Hospital, New Brunswick, N. J. Hospitals will wish to look up the details in *Trained Nurse*, 468 4th Ave., New York, N. Y. Feb., 1934. 35 cents.

Baltimore Health Dept. recently exhibited The Big Bad Wolf—Diphtheria.—illustrated in *Baltimore Health News*, Oct., 1934,

"We built our house of straw" (house down and out): "No Toxoid Prevention—Thought it was just a sore throat—and didn't call a doctor—*Diphtheria*."

"We built our house of sticks" (and showed it): "No Toxoid Prevention—Called the doctor too late—*Diphtheria*."

"We did not dare take a chance. We built our house of bricks" (and it shows): "Toxoid Prevention—Given each child 6 months of age."

The Health Service of Howard University, Washington, D.C., conducted an exhibit on cancer. Among more conventional features were the following as reported by Dr. E. H. Allen:

Our Art Department painted a large caption "This individual is on his way to the physician to get intelligent information concerning cancer." I constructed in a cut-out below this caption a Mickey Mouse on a cardboard back in the act of hurrying somewhere in business-like manner. It was my original idea to use a jumping jack for the purpose of portraying continual motion, but I was unable to secure one at the time. A note of levity was hereby included which I think to be of some value. I also used the suggestion of a mirror with an attractive caption "This individual should have intelligent information concerning cancer." It worked.

Wisconsin Anti-Tuberculosis Association had a traveling exhibit as a feature of its Silver Jubilee. More than 44,000 saw the exhibit in 11 cities. The story is told of how 5 members of 2 families were placed in a sanatorium because 2 children from different families visited the exhibit in one city. The exhibit was

. . . a revival; a Spring Health Festival in which the truth about how to live to prevent and cure tuberculosis was brought freshly to some and reiterated to others.

The Dept. of Health Education for Boys of Seward Park High School, New York City, conducted a health exhibit as a teaching project:

The exhibits selected were practical. They applied to the everyday life of the adolescent, and were somewhat different from that generally presented as part of the course in hygiene.

The material was arranged to appeal to seasonal interests and to stimulate curiosity in games, skills, and practices partly or wholly unknown to the pupils before this exhibit.

Among the units displayed were: Sunburn, Posture, Poison Ivy, Care of feet, Poisonous toadstools and edible mushrooms, Hornets, Snakes, Dental exhibit, First aid and resuscitation, Camping, Milk and nutrition, Medical examination, Safety.

REPORTING

"When a Community Desires Health," a good line, is the title of

Detroit's Department of Health report for 1933.

The Township Board of Health, Maplewood, N. J., has used the mimeograph quite successfully in producing a 10 page report, 5½" by 8½".

Again the New York City Department of Health reported Jan. 1, 1935, on the city's health record in the year before, including numerous comparative tables of death rates for 5 years. 13 legal size mimeographed sheets.

The original health exhibit street car; the "Health Gypsy" who last year visited 315 schools and other groups; "Gypsy Gay" and "Professor Health," radio health talkers, are the more unconventional features mentioned in "Thirty Years of Tuberculosis Work in St. Louis." This reports on Tuberculosis and Health Society, 613 Locust St., St. Louis, Mo.

"Their Health Is Your Health" (quotation from Alfred E. Smith) is the title of a money raising report of Henry Street Visiting Nurse Service. Including self-cover, 16 pages; lower case side heads in blue; both illustrations and statistics presented in Neurath symbol pictures done by Pictorial Statistics, Inc., simple pictorial district map on the cover. The whole effect to be seen to be appreciated. 99 Park Ave., New York, N. Y.

TO DO OR NOT TO DO

Is not 10 better than ten, or 1,000 better than one thousand, when we are writing copy and really wish the mind as well as the eye to recognize our important facts?

"Lantern Slides," by S. Schaffer. *Safety Education*, 1 Park Ave., New York, N. Y. Dec., 1934. 20 cents. Describes several methods for producing slides—on other subjects as well as safety.

Something for health workers to be on the watch for is reported in *Bulletin of American Hospital Assn.*:

The Anti-Vivisectionists, with ample funds at their disposal and with the support of powerful newspapers, are conducting an energetic campaign in 32 states, and are organized, as they publicly announce, to carry their fight to the finish. Model bills against vivisection will be introduced in 32 state legislatures at the coming sessions.

The enactment of these laws would be highly inimical to medical research. It would impede medical progress and hamper medical education. To prohibit animal experimentation would destroy the processes that have yielded many discoveries that have contributed to the prolonging and saving of the lives of many millions of our fellow-beings, particularly of our children.

Several articles have been written for those who are interested in the educational possibilities of the picture symbol as devised by Dr. Neurath. "The Neurath Pictorial Statistics," by M. E. Schwarzman, is accompanied by illustrations, and several reading references. *Progressive Education*, Washington, D.C. March, 1934. 50 cents. "Statistics for All," same author. *Educational Screen*, Chicago, Ill. Sept., 1933. 25 cents.

The seventh Gorgas Essay Contest is announced by Gorgas Memorial Institute, 1835 Eye St., N.W., Washington, D.C. Open to high school students; closes Feb. 15, 1935; with local, state, and national prizes. The committee seems to blunt the contest as an educational tool by offering a group of topics for the essay writers, rather than to seek widespread concentration on a single idea:

The conquest of yellow fever in Havana. Gorgas' work in Panama as a factor in building the Panama Canal. Gorgas as Surgeon General during the World War. The bearing of Gorgas' work on the health problems of today. Importance of the Periodic Health Examination during the World War and as a health measure today. Insect-borne diseases and present status of their control.

SCHOOL HEALTH EDUCATION

"Health Education in a Rural County," by R. E. Grout. Especially the part of school nurses in Cattaraugus

County. *Public Health Nursing*, 50 W. 50th St., New York, N. Y. Sept., 1934. 35 cents.

"Health Education in the State Normal School at Towson, Md.," by Spencer and Dowell. A school health monograph. Includes extensive reading references, without mention of prices. Metropolitan Life Insurance Co., New York, N. Y. *Free*.

"A Project in Rural School Health Education: Relationship with Community Health Programs," by Ruth E. Grout. *Quarterly*, Milbank Memorial Fund, 40 Wall St., New York, N. Y. Jan., 1935. Fourth in a series by director of health education study in Cattaraugus County.

"Health Education: The Review Lesson," by H. L. Conrad. Eighth in a series. *Mind and Body*, New Ulm, Minn. Dec.-Jan., 1935. 25 cents.

A "School Health Guide" comes from County Health Officer, El Centro, Calif. Mimeographed; 31 letter size pages. Health service; health education; health information.

MAGAZINE ARTICLES

"A New Deal in Dietetics," by Mary P. Huddleston, editor of *Journal of American Dietetic Assn.*, in *New York Herald-Tribune Magazine*. Dec. 9, 1934.

Today's nutrition points the way to buoyant youth, high adult vitality and longer life. A diet already adequate can probably be enhanced by added amounts of protective foods to insure positive and glowing health as well as protection against disease. . . . We may well believe that the dietary millenium has dawned. . . . Irradiated foods in general seem to be the latest word in dietetics.

"Saints, Witches and Babies," by Louise Summers. Health conditions among Mexicans in Arizona; "but a little understanding of the Mexican temperament and the Mexican background (and it is in this article) would at least throw some light onto the

subject." *Junior League Magazine*, 305 Park Ave., New York, N. Y. Feb., 1935. 30 cents.

FOR USE OR REFERENCE

"Good Posture in the Little Child," a poster based upon the pamphlet of same title. U. S. Children's Bureau, Washington, D. C. Both are *free*.

Historical material on diet and eating habits in "Vegetables in the Diet: Yesterday," by S. L. Smith (To be followed by "Today" and "Tomorrow.") *Journal of Home Economics*, 101 East 20th St., Baltimore, Md., 30 cents. Later the series will be reprinted for 15 cents.

In her syndicated column, released Dec. 16, 1934, Mrs. Roosevelt expressed an appreciation of the U. S. Public Health Service and told something about its history and present activities.

"Introducing Mr. Public Health," *Iowa Public Health Bulletin*, State Dept. of Health, Des Moines. Oct.-Dec., 1934. A public health study outline in 6 lessons intended for members of Congress of Parents and Teachers, Women's Division of Farm Bureau Federation, Federated Women's Clubs, etc. Covers the field but fails to focus attention upon adult health education.

A new set of 5 posters, "Healthy Childhood," has been issued by National Council for Maternity and Child Welfare, 117, Piccadilly, London, W. I. The text is limited to three or four words, such as:

Rest and sleep; The right food; Nature's food is best.

"Our Attitude Towards Cancer 'Cures,'" *Bulletin*, American Society for Control of Cancer, 1250 6th Ave., New York, N. Y. Jan., 1935. 10 cents. Why "cures" are tolerated; need for testing station.

Public Health Reviews, is an 8 page monthly issued by Division of Hygiene and Public Health, University of Michigan, Ann Arbor. Includes summaries

of current books, selected articles and pamphlets. *Free.*

"The Social Adjustment of the Tuberculous," by B. W. Burhoe. National Tuberculosis Assn., 50 W. 50th St., New York, N. Y. *50 cents.*

"Social Hygiene and Family Case Work," is a set of charts "of special interest to nurses, medical social workers, and others interested in family health and welfare." How syphilis spreads, case finding, pregnancy, etc. Miniature sets, letter size, *10 cents* (quantity rates); 17×22 inches, \$1.00; colored and mounted, \$5.00. American Social Hygiene Assn., 50 W. 50th St., New York, N. Y.

"That Mean Cold" is an old title but a brand new booklet. Simple cuts, small pages, a sub-title on nearly every page, well leaded type—all contributing

to easy reading. 11 pages and cover. John Hancock Mutual Life Insurance Co., Boston, Mass. *Free.*

That "Measles Threatens" we are reminded under that title which brings out the measles cycle as shown by New York morbidity statistics. *American Journal of Nursing*, 50 W. 50th St., New York, N. Y. Feb., 1935. *35 cents.*

"When the Unexpected Happens" is a first aid manual. A very clear table of contents; black face side heads; additional sub-headings centered on pages; simple illustrations with descriptive captions. One wishes that a little larger type could have been used to make easier reading when the user is excited by an emergency. 30 pages. John Hancock Mutual Life Insurance Co., Boston, Mass. *Free.*

BOOKS AND REPORTS

Amebiasis and Amebic Dysentery—

By Charles F. Craig, M.D. *Springfield, Ill.: Thomas, 1934.* 315 pp. 54 ill. Price, \$5.00.

The epidemic of amebic dysentery in Chicago in 1933 emphasized the deplorable lack of knowledge of amebiasis and amebic dysentery by the medical profession and laboratory workers in this country, and created an insistent demand for an authoritative treatise which would be of practical value as a reference book. This demand has been met in an exceptional manner by Colonel Craig who is considered the best authority on the subject in this country. The monograph which he presents will undoubtedly stand as a classic in medical literature and will find immediate use in all medical libraries as well as in the hands of many physicians, public health workers, and laboratory technicians.

The monograph contains 12 chapters. The first deals with the history and geographical distribution of amebic infection and emphasizes the fact that acute amebic dysentery is only one of the many manifestations of infection with *Endameba histolytica*, and that the parasite is of world-wide distribution and an important cause of disease in temperate as well as in tropical regions. The chapter on etiology describes *E. histolytica* in detail, its life cycle, and its method of reproduction and transmission. It is illustrated by excellent photomicrographs and drawings.

The chapter on epidemiology takes up the subject of incidence, sources of infection, variations in the effect of the ameba on different individuals, epidemics, reservoir and transmitting hosts,

and the influence of age, sex, race, climate, and individual immunity to the disease.

The two chapters on pathology describe in detail the gross and microscopic lesions produced in the intestines and in other organs and tissues of the body. They are illustrated by splendid photographs, mostly from the U. S. Army Medical Museum. Symptomatology, complications and sequelae are treated in great detail. The clinical manifestations of amebic infection and the wide variation in the symptoms and physical signs which may be produced are emphasized.

The chapter on clinical diagnosis calls attention to the difficulty of differentiating amebic infection as it affects the intestine, liver, lungs, and other organs from other diseases. The chapter on laboratory diagnosis describes in detail the other amebae which are found in the human intestine and emphasizes the importance of well trained technicians in their differentiation. It also describes methods of fecal examination and the technic of artificial cultivation of *E. histolytica*.

A chapter is devoted to a consideration of the complement fixation test, which was originated by the author and has proved to be of value in diagnosing obscure cases of amebiasis and in following the effects of treatment.

The discussion of prophylaxis is of special interest and value to public health workers. It stresses the importance of proper disposal and treatment of human excreta, the protection and sterilization of water supplies, the necessity for careful supervision by health officials of the plumbing in public buildings, the protection of food from

flies, and the supervision of public food handlers. Emphasis is laid upon the importance of personal sanitation and educational measures to prevent the spread of amebic infection.

The final chapter on treatment is especially valuable. The author discusses the history and use of all the drugs which have been advocated in treatment. He warns against the excessive use of emetine and other drugs of high toxicity and calls attention to the newer drugs which have been found to be more effective and less toxic. He outlines the treatment for amebic infections of varying degrees of severity as well as the medical and surgical treatment of amebic abscesses of the liver and lung. This chapter should prove to be of special value in encouraging safer and more effective treatment of infected individuals. Each chapter is followed by an extensive list of references and the book is furnished with a complete index.

The book is beautifully printed and well bound, for which the publisher is to be congratulated. The reviewer recommends it most highly to all public health workers. HENRY E. MELENEY

Recent Advances in Allergy—

Asthma, Hay Fever, Eczema, Migrant, etc.—By George W. Bray. Philadelphia: Blakiston, 1934. 503 pp. Price, \$5.00.

The second edition of Bray's book represents the most comprehensive review on this subject which has appeared. It is written in even better and more readable style than his first review, published some 3 years ago.

Bray's broad personal experience with the study of allergy has enabled him to read and write on the subject in an understanding way. He illustrates his own subject matter by citing and reviewing an enormous number of articles in logical order and sequence. He takes up practically every phase of

the subject and discusses it adequately and well, and in a style which, though brief and concrete, is blessed with clearness.

The book shows throughout that the enormous volume of literature which we have on allergy can be mastered by the industry and intelligence of one man, and that it can be presented in such a way as to be used by students and writers on almost any branch of the subject for obtaining a brief and clear review of late literature in a short period of time.

This stupendous effort on the part of Bray ought to be appreciated and used by students and writers on allergy who wish to acquaint themselves quickly with the recent ideas on this subject without the necessity of reading the hundreds of articles which have been written on each different phase of the subject.

I wish to acknowledge with thanks, Bray's acceptance of physical allergy (altered reactivity to the action of physical agents) as a specific clinical entity which can be, though need not necessarily be, related to sensitiveness caused by material agents.

The book can be recommended as one of the most complete and beautifully written reviews which has appeared on the subject. The printing and make-up of the book are excellent.

W. W. DUKE

Poliomyelitis. A Handbook for Physicians and Medical Students—By John F. Landon, M.D., and Lawrence W. Smith, M.D., with a section on Orthopedic Aftercare by Gary DeN. Hough, Jr., M.D. New York: Macmillan, 1934. 275 pp. Price, \$3.00.

This small volume summarizes the knowledge and handling of poliomyelitis in the hospital which bore the brunt of the two largest epidemics of this disease in history. It can be recommended as

a well considered, sane, and competent handbook, without bias toward particular theories or procedures, and balanced in its consideration of the various aspects of the disease. The important section on aftercare has naturally been entrusted to one familiar with the results rather than with the acute stage of the disease. It is interesting that in contradiction to a recent German book on the disease which devotes only a short paragraph to reëducation, the procedure which, combined with rest or avoidance of stretching the weakened muscles, is fundamental in the treatment of poliomyelitis, the present volume stresses these principles as laid down by Dr. Robert W. Lovett.

In regard to the much debated use of serum for treatment or for prophylaxis, the weight of the authors' opinion seems to be against serum being of any benefit in treatment, and as for prophylaxis, the most that is said is that "it gives great psychological satisfaction to anxious parents." J. P. LEAKE

The Doctor in History—*By Howard W. Haggard. New Haven: Yale University Press, 1934. 408 pp. Price, \$3.75.*

This book, according to the author, is an attempt at a "history of health," written allegedly for his children. As such, there is no attempt at scholarly treatment, and the work gives the impression of a series of sketches. The style makes it easy to read, and the book is entertaining, though it contains little that a man who is moderately well informed does not know, except for an interesting detail here and there.

The picture of the "doctor" throughout history until quite recent times gives the lay reader the vivid impression of a being with whom it would be very dangerous to visit even if in good health, and especially so if ill. This being originally crystallized the superstitions of primitive man to his

personal advantage, and later lagged behind the march of general human progress by several centuries, not to be budged from Galenic tradition either by the evangelism of Paracelsus or the satire of Molière. Perhaps this is a true picture.

The book is profusely illustrated with interesting woodcut reproductions, some of which have a bearing on the text. Many have no apparent bearing, as for example, one on page 162, showing certain forms of legal torture. It is nowhere explicitly stated whether this was one of the functions of the medical profession or not.

The volume is well indexed, though for what purpose, it is difficult to say.

ALLEN E. STEARN

A Nutrition Program and Teaching Outline—*Prepared and published by the Philadelphia Child Health Society, 311 South Juniper Street, Philadelphia, 1934. 156 pp. Price, \$1.00 postpaid.*

This volume is a complete revision of the first edition of 1927, bringing up to date the factual material and educational methods. It has been developed primarily for use in the health centers and clinics of the Division of Child Hygiene, Department of Public Health of Philadelphia; but it may be adapted readily to similar centers in other parts of the country.

As stated in the foreword of this outline,

This outline continues the clarification of the laboratory findings, elaborates on the special value in certain foods and combinations of food, and stresses proper methods for the preparation of foods. It also stresses the value of good health habits, inculcated early as an important adjunct to nutrition; it brings to the attention of the student or reader the important part played by the removal of physical defects which so frequently interfere with proper nutrition even when the best balanced diets have been supplied.

Nutrition and diets for children at various age levels are given as lesson outlines which may be used flexibly in health centers or in mothers' clubs and classes. The outlines are presented clearly and concisely with helpful illustrative material and references. A selected list of reference from recent literature on nutrition appears at the end of the book. RICHARD A. BOLT

Practical Everyday Chemistry—By H. Bennett. New York: Chemical Publishing Co., 1934. 305 pp. Price, \$2.00.

This book should prove to be a valuable manual in many laboratories as it gives directions for preparing a variety of products as well as the composition of many common products. Various chapters give working formulae for adhesives, agricultural products, paints and related products, cosmetics and drugs, food products, beverages, inks and carbon paper, leathers, oils, constructing materials, paper, photography, plating, polishes, rubber and plastics, soaps and cleaners, textiles and many other products in use in daily life. One chapter includes tables, and other useful information regarding sources of information and materials.

Brief introductory paragraphs at the beginning of each chapter are informative. In some cases, these could have been enlarged to advantage. The author has had previous experience as the Editor of the *Chemical Formulary*.

C. S. PEDERSON

Your Meals and Your Money—By Gove Hambidge. New York: McGraw Hill, 1934. 190 pp. Price, \$1.50.

As a basis for a popular presentation of sensible diets in relation to income, Mr. Hambidge has taken the data compiled by the nutritional workers of the U. S. Department of Agriculture. These he has expanded into a readable and

authoritative text, written with a sparkle, which transcends in interest and entertainment the scientific material usually emanating from government bureaus. The average consumer faced with the problem of securing real nutriment from a restricted food budget will get many practical suggestions from the author's series of plans for diets at various levels of nutritive content and cost. Although writing primarily for the lay consumer, the author, hitherto a stranger to the complex field of dietetics, has wisely gone to the leading nutritional authorities for material and has shunned the false precepts of the food faddists who are so ubiquitous and so vociferous in this country. Health officials and physicians will find the book well worthwhile, and relief workers will find it indispensable. The average taker of sustenance may be jogged out of a rut by it.

JAMES A. TOBEY

The Theory of Play—By Elmer D. Mitchell and Bernard S. Mason. New York: Barnes, 1934. 547 pp. Price, \$2.80.

The changes that have come during the last decade in our knowledge of psychology and in the technics in the field of recreation and physical education have made necessary the rewriting of the material in this book, which appeared in 1923 as *The Theory of Organized Play*, by Wilbur P. Bowen and Elmer D. Mitchell. The result is an excellent text.

It is divided into 4 major parts: Historical Background; Theory of Play; The Need for Play; and Administration of Play.

In their discussion of the theories of play, the authors expound as the most likely one the theory of play as self-expression. We play as we do because of our physiological and anatomical structure, our physical fitness, and our psychological inclinations. The type of

play, too, is influenced by habits and attitudes (training), by social contact and physical environment. Certain "universal wishes," such as those for new experiences, for security, for response, and for recognition, also impel us to play. To these may be added the wish for participation and the wish for the esthetic or beautiful.

For public health officials and agencies this discussion of the philosophy of play should have deep interest, since the success of health campaigns depends so intimately on health education.

This text is our most thorough, dependable, and interestingly written treatise on the theory and administration of play. It should be a part of the library of every educator.

CHARLES H. KEENE

A Short History of Some Common Diseases—*By divers authors. Edited by W. R. Bett. London: Oxford University Press, 1934. 211 pp. Price, \$3.50.*

The editor describes this book as an original venture in medical literature. So it is. It is for the most part interesting and well written, and if it is followed by another volume giving the history of a larger number of diseases, it will have a distinct place in the history of medicine.

It has not been as carefully edited as it might have been. It grates on one, for example, to find the isolation of insulin ascribed to Macleod, Banting, and Best. The fact is that laboratory facilities had been given to Banting and Best during the summer when Macleod was in Europe, and that he had rather discouraged Banting. When Macleod came back and found that the epoch-making discovery had been made, he organized further research and assisted in the production of insulin, but the discovery belongs to Banting, who was assisted materially by Best.

There are also mistakes in spelling

of proper names, which is generally considered inexcusable. The name of J. F. Schamberg is spelled with an "o."

The book is well printed and of convenient size. MAZYCK P. RAVENEL

Nursing Schools—Today and Tomorrow—*Final Report on the Grading of Nursings Schools—New York City, 1934. 268 pp. Price, \$2.00.*

What is wrong with nursing? What should we expect of the professional nurse? Why are there so many unemployed nurses and still so many sick unnursed and so many hospitals understaffed? This final report of the Committee on the Grading of Nursing Schools answers these and many other questions, giving us cold facts gathered in their 8 year studies carried on all over the United States. For the nursing schools it suggests a course ahead in which nursing education may be conducted on the same educational basis as that of all other professions. For the private duty nurse it offers hope for practical plans of providing quality nursing to patients who need it at a price satisfactory to both the nurse and the nursed. For the administrators of hospitals and nursing schools it gives not only definite and to-the-point plans for providing nursing service without dependence upon student service, but can also point to successful completion of such plans in different parts of the country. For the consumer, the public, the book represents a sincere effort on the part of a profession engaged in a vital community service to find a way in which it can best meet the needs of that consuming public, if the public will but hold up the hands of the profession.

The picture that this final report gives of the present status of nursing schools in this country does not engender pride in our hearts. However, the improvement made in the 8 years since the committee made its first grad-

ing, and the brave stand which the committee has taken regarding the way ahead promise a hopeful future.

Public health workers interested in the supply of public health nurses, the greatest agents for carrying health teaching into the home, cannot afford to ignore the pertinent facts in this book

VIRGINIA A. JONES

The Child: His Origin, Development and Care—*By Florence Brown Sherbon, A.M., M.D. New York: McGraw-Hill, 1934. 707 pp. Price, \$3.50.*

This is no ordinary book on child care. It bears the marks of careful and prolonged scientific scholarship and covers thoroughly the whole range of child life as an integrated pattern of the social structure. The only book comparable to it in English is Feldman's *Principles of Ante-Natal and Post-Natal Child Hygiene*, published in 1927.

Dr. Sherbon, however, is not content with merely stating the results of modern biochemical and physiological research; she relates these definitely to a philosophy of child life which runs consistently through the entire volume. If one were to attempt to capture this philosophy, it might be stated to be the Gestalt psychology of structural patterns framed in the theory of relativity. She writes that

When we try to put these two ideas together—relativity and pattern—they integrate very consistently. Life ever struggles toward patterned form and expression, a struggle into which the factors of relativity to environment and time ever enter.

Reviewing the factual material in this fascinating volume, I find an arrangement which is logical and which covers the entire gamut of the child from ovum, and before, to his entrance into school. The chapters are grouped conveniently into three parts:

I. *Before the Child*: Fundamental

organization of life; physical and social heredity; anatomy and physiology of reproduction; love, courtship and marriage; physiology and hygiene of pregnancy.

II. *Enter the Child*: Factors relating to birth and puerperium, the baby's first year, the important principles of the hygiene of infancy and childhood.

III. *Development, Behavior and Training*: Section which brings up to date the growth and development of the child, including the new theory of behavior and learning and describing carefully the various developmental periods as they shade into one another. Two helpful chapters for students and parents are "Religious, Aesthetic, and Moral Training of the Young Child" and "Observation of Young Children."

The book is illustrated beautifully and appropriately, especially the chapters on growth and development of the child. A selected list of references is found at the end of each chapter. The glossary of more technical terms and the complete index will prove very helpful to the student. This is a book which every student of the child should read from cover to cover, thoroughly digest, and then keep close at hand for ready reference. RICHARD A. BOLT

Periodic Fertility and Sterility in Woman: A Natural Method of Birth Control—*By Professor Hermann Knaus, Head of the Clinic for Gynecology and Obstetrics of the German University of Prague, with a Foreword by F. H. A. Marshall, F.R.S., translated by D. H. and Kathleen Kilchin. Vienna: W. Maudrich, 1934 (Concip Co., Hobart, Indiana). 162 pp. 64 ill. Price, \$6.50, including a separate special calendar in pocket. Calendar alone \$1.50.*

Studies of this kind are of great value, not so much because they provide an assured hope of a safe period,

so expanded that it will include all but 1 week out of each month, as because they will beget a powerful impulse toward regular recording of dates of menstruation and fruitful and unfruitful intercourse (and also of midmonth discomfort pointing to ovulation), and thus secure sorely needed factual material. As long as observations on human beings lack accuracy inherent in biology in cages, we have to depend on assessment of the truth of claims like those of Ogino and Knaus by checking against each other long series of patients' histories from various sources. At present the only real test of the Ogino-Knaus assurances is at the possible cost of one more child, or one more abortion.

The form of calendar is a device worth while for the intelligent, or doctor-guided, in that it demonstrates at a glance regularity or irregularity in the person keeping it, and the average length of her cycle. Several important studies show that, among women, less than 60 per cent have a 4 week type, even when admitting a range of 4 or 5 days. Thus accumulating evidence on the frequency of irregularity rather vitiates the utility of some of the new formulae. As a prime necessity and preliminary for using the calendar, Knaus insists that it must be kept for a year "scrupulously and without fail," in order that thereafter his conclusion can be put to work, namely, the "unimpeachable certainty" that "in women with normal physiology, *ovulation always takes place on the 15th day before the onset of the period.*" Always? On a given day?

Ogino, as Knaus shows, had preceded him in insistence on counting backward, but Knaus based his conclusions on new experiments, devising a way of registering uterine contractions to show that after corpus luteum formation, pituitary extract no longer caused contraction of the uterine muscle layers, either in rab-

bit or woman, thus demonstrating dates of ovulation.

The book presents an excellent and lucid review of the whole subject and a comprehensive bibliography. Now we await the evidence of extensive and well attested experience from those who seek the most fertile days as well as those who plan to avoid them. And we hope for new research to discover tests of irregular habits of ovulation—tests that are readily available, these, in turn, being predicated on funds for developing them.

Recent publications for professional and lay readers include the following:

Miller, A. G., Schulz, C. H., Anderson, D. W., Miller Clinic, Hobart, Indiana. *The Conception Period in Normal Adult Women.* *Surg. Gynec. Obst.*, 56: 1020-1025, 1933.

Miller, A. G. Is the "Safe Period" Safe? *Biol. and Med. Aspects of Contraception.* Edited by Margaret Sanger. Nat. Com. on Fed. Legislation for Birth Control. Washington, 1934, pp. 28-37.

Ogino, K. *Conception Period of Women.* Med. Arts Publishing Company, Harrisburg, Pa., 1934.

Pederson, Victor C. *Nature's Way.* Putnam, New York, 1934.

HAVEN EMERSON

Keeping a Sound Mind—By John J. B. Morgan. New York: Macmillan, 1934. 440 pp. Price, \$2.00.

In these days of increasing appreciation of the importance of mental hygiene, this book should be a valuable find for persons seeking a really good textbook in that field, prepared with the college student in mind. The material is based upon modern psychology, but so stripped of technical terminology that the layman or the college freshman can comprehend it fully. Such intriguing chapter headings as *How to Fight*, *How to Get Things Done*, *Getting Along with People*, arouse a curiosity to sample those particularly suggestive chapters.

With its excellent table of contents, logically progressive chapters, review questions at the end of each chapter, a brief list of references for further reading, and its complete index, the book meets such requirements in text-

book construction. The author presents material the use of which would aid the student in the establishing of desirable mental and emotional habits, and the acquiring of the right attitudes toward the game of life.

The book is well printed and bound.

ELSIE B. SNEED

Leisure-Time Interests and Activities of Business Girls—By Janet Fowler Nelson. New York: The Woman's Press, 1934. 113 pp. Price, \$.75.

This Research Study was conducted during 1931–1933 under the Laboratory Division of the National Board of the Y.W.C.A. by the Director. Necessarily, in so brief a report, it is largely statistical.

These young business women make up an increasing proportion—16.6 per cent in 1920, 18.8 per cent (2,000,000) in 1930—of employed women. It is a factual study of 1,000 young women, and gives apparently a cross-section of the activities of this group, which is of peculiar sociological interest.

CHARLES H. KEENE

Allergy and Applied Immunology—A Handbook for Physician and Patient, on Asthma, Hay Fever, Urticaria, Eczema, Migraine and Kindred Manifestations of Allergy—By Warren T. Vaughan, M.D., Richmond, Va. (2d ed.) St. Louis: Mosby, 1934. 420 pp. Price, \$5.00.

Vaughan, in his usual story-book fashion, writes a second edition of his book because, as he states, the rapid advance in our knowledge of the subject makes a volume on allergy rapidly become out of date. On this account an old text ceases to be authoritative. What appeared to be a truism of yesterday may be an inaccuracy today. He states that if the text is not up to date it is better out of print.

Vaughan reviews the subject with

reasonable brevity and presents the subject in a way which is amply simple for the general practitioner and can also be understood by patients. He emphasizes the need of knowledge on the part of the general practitioner for diagnostic methods and thinks that with this knowledge he can contribute immensely to the welfare of his patients. Vaughan omits from his book the technicalities on desensitization treatment because of a belief that this is not yet adapted to widespread use by those who are not thoroughly familiar with the subject. This work, he thinks, ought to be diverted to specialists who have acquired enough knowledge and experience with allergic patients to make desensitization therapy successful. Otherwise he thinks such patients are not likely to receive the desired relief which can be acquired through this study and that this practice subjects the entire method to unjust criticism.

Vaughan's book is practical throughout. He discusses in simple manner such topics as diagnostic methods, pollen surveys, location of allergens, methods of allergen avoidance, food allergens and their whereabouts, elimination diets, and the manifestations of allergy. An important chapter, VIII, is devoted to a discussion of geological locations, and the part played by altitude, heat, air humidity, and wind in symptomatology.

The book can be highly recommended as safe and sound for general practitioners and patients.

The printing and make-up of the book are excellent. W. W. DUKE

Healthy Babies Are Happy Babies—Complete Handbook for Modern Mothers—By Josephine Hemmway Kenyon, M.D. Boston: Little, Brown, 1934. 321 pp. Price, \$1.50.

Out of the wealth of experience in instructing mothers and answering their

multitude of questions through the Health and Happiness Club of *Good Housekeeping*, Dr. Kenyon has acquired a facility of presenting subject matter which is a delight to read. She confesses modestly in the preface that it took courage to write another book on child care while she faced three long shelves of similar publications treating every phase of the subject. She has justified her temerity, however, by producing a compact handbook, conveniently arranged for reference, which answer the questions of mothers, and prospective mothers, in clear, concise, "homey" language. The book has a direct, personal appeal which every intelligent mother will appreciate.

The material is arranged in chapters which consider chronologically the important features of each stage in the growth and development of the child, beginning with the prenatal period and extending through the third year. Two helpful chapters on the common communicable diseases of childhood and on emergencies are added to the general plan. The appendix contains a clarification of the usual foods given to children up to 3 years of age, a vitamin table, and foods for different months up to one year of age. RICHARD A. BOLT

Stand Up and Slim Down—By Ettie A. Hornibrook. Garden City, N. Y.: Doubleday, Doran, 1934. 167 pp. Price, \$1.95.

This treatise is devoted to a discussion of the causes and correction of constipation and obesity in women, with the major emphasis on "restoration exercises," the aim being "youthful slenderness, graceful carriage, and poise."

After a brief description of the effects of weakened abdominal and pelvic muscles upon constipation and, oftentimes the resultant marital inefficiency and unhappiness, a considerable portion of the text is devoted to a descrip-

tion of movements and posture in their relation to constipation and bodily health.

Another relatively large section is devoted to a discussion of food selection, as related to obesity and intestinal efficiency.

In the section on movements, there are some excellent postural—including foot, leg, and pelvic—exercises. The effects of faulty shoes, especially too high heels, and the need of proper corset and brassiere are discussed.

This is a much worthwhile book for laymen and physicians. It is made better and more usable by a careful index.

CHARLES H. KEENE

Medicine Marches On—By Edward Podolsky, M.D. New York: Harper, 1934. 343 pp. Price, \$3.50.

The reviewer has always felt some doubt of the value of books of this type, though it must be admitted that the public will read them when they will read no others, and the facts of medical research do need some popularizing. Unfortunately, those who have the facility for popular writing make use of their gift, and intentionally or otherwise, give some wrong impressions. These are sometimes followed up by lay readers by the study of truly scientific books, but more often not.

The book under discussion strikes us as being one of the best of its type. It is unusually complete and the author has evidently kept track of investigation in the field as well as in laboratories. It contains a vast amount of information, practically all of which is correct as far as the reviewer can determine, though as already said, much of it is put in ways which are not pleasing. The titles are almost all dramatic, for example: The Poison-Fighters, Radium Bullets and Crazy Cells, Obesity and the Fat-Melters, etc.

The English as well as the spelling of names could be improved. However,

the book is intensely interesting and we hope that it will serve a useful purpose. Unfortunately, most readers have not the background for judging the exaggerations, overemphasis, etc. There are

many quotations, all in italics, from well known scientists and medical men. The printing is excellent and the paper is light, making it a pleasant book to read.

MAZŮCK P. RAVENEL

BOOKS RECEIVED

- POLIOMYELITIS.** A Handbook for Physicians and Medical Students. By John F. Landon and Lawrence W. Smith. New York: Macmillan, 1934. 275 pp. Price, \$3.00.
- STANDARD CLASSIFIED NOMENCLATURE OF DISEASE.** 2d ed. Compiled by The National Conference on Nomenclature of Disease. Edited by H. B. Logic. New York: Commonwealth Fund, 1935. 870 pp. Price, \$3.50.
- ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES FOR THE FISCAL YEAR 1934.** Washington: Government Printing Office, 1934. 143 pp. Price, \$.75.
- ANNUAL REPORT OF THE SURGEON GENERAL U. S. ARMY TO THE SECRETARY OF WAR, 1934.** Washington: Government Printing Office, 1934. 205 pp. Price, \$.15.
- ABASTÉCIMIENTO DE AGUA POTABLE (DRINKING WATER SUPPLY).** By Juan Lazaro Urra. Madrid: Revista de Obras Publicas, 1935. 502 pp. Price, 46 Pesetas.
- THE CRIPPLED AND THE DISABLED.** By Henry H. Kessler. New York: Columbia University Press, 1935. 337 pp. Price, \$4.00.
- STAMMERING AND ALLIED DISORDERS.** By C. S. Bluemel. New York: Macmillan, 1935. 182 pp. Price, \$2.00.
- PERSONAL HYGIENE APPLIED.** 5th ed. By Jesse Feiring Williams. Philadelphia: Saunders, 1934. 529 pp. Price, \$2.25.
- GROWTH AND DEVELOPMENT OF THE YOUNG CHILD.** 2d ed. By Winifred Rand, Mary E. Sweeney and E. Lee Vincent. Philadelphia: Saunders, 1934. 429 pp. Price, \$2.75.
- THE POPULAR PRACTICE OF FRAUD.** By T. Swann Harding. New York: Longmans Green, 1935. 376 pp. Price, \$2.50.
- COMMUNITY HYGIENE.** Rev. ed. By Dean Franklin Smiley and Adrian Gordon Gould. New York: Macmillan, 1935. 369 pp. Price, \$2.00.
- INFANTILE PARALYSIS.** By George Draper. New York: Appleton-Century, 1935. 167 pp. Price, \$2.00.
- TUBERCULOSIS.** By Fred G. Holmes. Appleton-Century, 1935. 312 pp. Price, \$2.00.
- FUNDAMENTALS OF DAIRY SCIENCE.** 2d ed. By Associates of Lore A. Rogers. New York: Reinhold Publishing Corporation, 1935. 616 pp. Price, \$6.00.
- REPORT ON THE EVALUATION OF PRENATAL CARE.** By Margaret Tyler, J. H. Watkins and H. H. Walker. New Haven: Institute of Human Relations, 1934. 68 pp. Price, \$1.00.
- VOLUNTARY STERILIZATION.** By C. P. Blacker. New York: Oxford Press, 1934. 145 pp. Price, \$1.75.
- MEMOIRS OF A SMALL-TOWN SURGEON.** By John Brooks Wheeler. New York: Stokes, 1935. 336 pp. Price, \$3.00.
- RECORD BOOK FOR TUBERCULOSIS PATIENTS.** By Lawrason Brown. New York: Journal of the Outdoor Life, 1935. Single copies \$.15, special price in quantities.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Rats, Typhus and Relief—Endemic typhus is a serious problem in Alabama and some of the other southern states, thanks to the rat, his fleas, absence of rat proofing, ample food and mild winter climate. CWA rat control is helping.

BAKER, J. N., *et al.* Endemic Typhus in Alabama. Pub. Health Rep. 50, 1:12 (Jan. 4), 1935.

Lead Poisoning—A clinically proved and detailed method is reported upon the control of lead poisoning in which experience counts much for success in administration.

BELKNAP, E. L. Control of Lead Poisoning in the Worker. J.A.M.A. 104, 3:205 (Jan. 19), 1935.

World Health—What the health organization of the League of Nations has done, is doing, and plans to do may seem overly ambitious, but new generations will be amused by its limited vision, this reporter believes.

BOUDREAU, F. G. Health Work of the League of Nations. Milbank Quarterly 13, 1:3 (Jan.), 1935.

Getting Rid of Sewage Sludge—Difficulties experienced in solving the ever present problem of sludge disposal in sewage treatment are set forth in this discussion of modern methods.

CERNY, P. J. Treatment and Disposal of Sewage Sludge. Munic. San. 6, 1:10 (Jan.), 1935.

Practical Tuberculosis Control Economics—About a quarter of the uncoöperative tuberculosis contacts in New Haven (611 persons) were finally induced to submit to an X-ray exami-

nation. In this large group no active cases were found and only a few healed lesions. From this it is concluded that the examination of the contact who consistently fails to coöperate is not worth the expense of the extraordinary efforts needed to get him into the clinic.

EDWARDS, H. R. An Attempt to Secure X-Ray Examination of the Uncoöperative Tuberculosis Contact. New Eng. J. Med. 212, 5:198 (Jan. 31), 1935.

Advice about Buying Food—As an example of suggestions to field workers in educating families to make better purchases of foods, this paper indicates that the method might well be applied to other health educational projects.

FISHER, R. W. What Shall the Public Health Nurse Tell Families about Buying Food? Pub. Health Nurs. 27, 1:11 (Jan.), 1935.

From Settlement to Health Center—A fine, brief story of the development of the neighborhood health service idea and its present-day manifestations.

HISCOCK, I. V. The Development of Neighborhood Health Services in the U. S. Milbank Quart. 13, 1:30 (Jan.), 1935.

When Is Gonorrhea Cured?—Gloomy conclusions about the curability of gonorrhea follow this summary of the criteria of cure which include palpation, culture, complement fixation test, and provocative diet.

KING, A. J. The Criteria of Cure of Gonorrhea in the Male. J.A.M.A. 104, 3:178 (Jan. 19), 1935.

Tuberculosis Work Well Done—The results of the Cattaraugus County Tuberculosis case-finding program are

summarized for the benefit of the world-wide anti-tuberculosis movement. It is emphasized that tuberculosis control can grow at its best only with an adequate public health program.

KINGSBURY, J. A. Methods in Further Control of Tuberculosis. *Milbank Quart.* 13, 1:68 (Jan.), 1935.

Asbestos in Lungs—Lung fibrosis caused by asbestos dust appears to be milder than that produced in silicosis. However, dust in asbestos plants can, and should, be reduced and workers should have periodic physical examinations.

LANZA, A. J., *et al.* Effects of the Inhalation of Asbestos Dust on the Lungs of Asbestos Workers. *Pub. Health Rep.* 50, 1:1 (Jan. 4), 1935.

Incidence of Lead Poisoning—In industrial hygiene studies, when the gastrointestinal diseases outnumber respiratory diseases, suspect the possibility of lead poisoning. This condition is common and often results in wrong diagnoses.

LANZA, A. J. Epidemiology of Lead Poisoning. *J.A.M.A.* 104, 2:85 (Jan. 12), 1935.

Digestion's Time Table—Ordinary meals leave the stomach in 4 hours; a very large one in 5; large amounts of fat delay emptying of the stomach; concentrated carbohydrates leave quicker than natural ones; cooking shortens digestion time for some foods, lengthens others; finally, hunger apparently does not depend upon vigorous peristalsis. These fluoroscopic findings, except the last, confirm accepted beliefs.

MAILE, W. C. D., and SCOTT, K. J. L. Digestibility of Common Foodstuffs as Determined by Radiography. *Lancet.* 1, 1:21 (Jan. 5), 1935.

What Water Can Be Made Fit to Drink?—A basis is proposed for formulating a limited standard of pollution for sources of water supply in the hope that it will stimulate discussion and action by sanitarians.

STREETER, H. W. Limits of Pollution Loadings for Water Purification Systems. *J. Am. W. W. Assn.* 27, 1:1 (Jan.), 1935.

ASSOCIATION NEWS

SIXTY-FOURTH ANNUAL MEETING

MILWAUKEE, OCTOBER 7-10, 1935

Headquarters: Hotel Schroeder

MILWAUKEE LOCAL COMMITTEE

- Hon. Daniel W. Hoan, Mayor of Milwaukee, *Honorary Chairman*
Dr. John P. Koehler, Commissioner of Health, Milwaukee, *General Chairman*
- Rt. Rev. Joseph F. Barbian, Superintendent of Catholic Schools
Mrs. Victor L. Berger, Milwaukee Board of School Directors
Dr. Stephen Cahana, President, Wisconsin State Board of Health
Mrs. Eben J. Carey, Past-President, Woman's Auxiliary, State Medical Society of Wisconsin
Dr. M. G. Cavanaugh, President, Milwaukee County Dental Society
William L. Coffey, Manager, Milwaukee County Institutions
J. G. Crownhart, Executive Secretary, State Medical Society of Wisconsin
Charles F. Dineen, Secretary, Coöperative Milk Producers Association
Mrs. Robert E. Fitzgerald, President-Elect, Woman's Auxiliary, Medical Society of Milwaukee County
- Mrs. Leon I. Glasgow, City Council of Parent-Teacher Associations
Fred D. Goldstone, Executive Secretary, Milwaukee Community Fund
Dr. C. A. Harper, Health Officer, State of Wisconsin
Jeanette M. Hays, Executive Secretary, 4th & 5th Districts, Wisconsin State Nurses Association
Mrs. Harry J. Heeb, President, Woman's Auxiliary, Medical Society of Milwaukee County
Mrs. G. A. Hipke, Superintendent, Milwaukee General Hospital
Charles W. Pendock, Chairman, Safety Division, Association of Commerce
Milton C. Potter, Superintendent, Milwaukee Public Schools
Mrs. Charles Reichenbaum, President Milwaukee County Federation of Women's Clubs
Peter T. Schoemann, Federated Trades Council
Dr. J. J. Seelman, Wisconsin State Board of Health
Dr. Millard Tufts, The Medical Society of Milwaukee County
- Rev. A. F. Berens, Regent, Marquette University Medical School. *Chairman, Attendance, Reception and Hospitality Committee*
Dr. E. V. Brumbaugh, Deputy Commissioner of Health. *Chairman, Meeting Rooms Committee*
Dr. Hoyt E. Dearholt, Executive Secretary, Wisconsin Anti-Tuberculosis Association. *Chairman, Publicity Committee*
Frank Effinger, Milwaukee Dairy Council. *Chairman, Finance Committee*
Dr. W. J. Egan, Milwaukee Chapter, American Red Cross. *Chairman, Milwaukee Exhibits Committee*
Earl L. Ferguson, Manager, Convention Bureau, Association of Commerce. *Chairman, Registration and Information Committee*
Rev. Herman L. Fritschel, President, Milwaukee Council of Hospitals. *Chairman, Inspection Trips Committee*
Dr. B. L. Corbett, Secretary, Milwaukee Safety Commission. *Chairman, Entertainment Committee*
Mrs. Stanley Stone, President of the Board of Directors, Visiting Nurse Association. *Treasurer*
Mrs. Rock Sleyster, State President, Women's Auxiliary
George A. Dundon, Milwaukee Health Department. *Secretary*

MILWAUKEE ADVISORY COMMITTEE

- | | |
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| Chief Peter Steinkellner | Dr. Charles Fidler |
| William C. Knoelk | Dr. Dexter Witte |
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 Dr. Henry J. Gramling

RESIGNATION OF DR. HAYHURST FROM THE EDITORIAL COMMITTEE

EMERY R. HAYHURST, M.D., Ph.D., of Columbus, Ohio, and for seventeen years Associate Editor in Industrial Hygiene on the *American Journal of Public Health*, resigned as of January 1, 1935. This was necessitated because of the demands of his own work. Dr. Hayhurst has been a Member of the Association since 1913, and was elected a Charter Fellow in 1922.

The Committee on Meetings and Publications, in session on Saturday, January 12, 1935, adopted the following:

Resolution

WHEREAS, Dr. Emery R. Hayhurst has served on the Editorial Committee of the *American Journal of Public Health* since 1918, and
 WHEREAS, the Industrial Hygiene interests of the Association have been served by countless pages of material emanating from his pen, and
 WHEREAS, his advice and assistance to the

Editor have been of incalculable value, therefore be it

RESOLVED that the Committee on Meetings and Publications extend to him its warm thanks and deep appreciation for his wisdom, counsel, and continuous labors which have resulted in distinct improvement in the *American Journal of Public Health* and definitely valuable contributions to public health literature.

C. C. YOUNG, D.P.H., *Chairman*
 HOMER N. CALVER
 ARTHUR P. MILLER
 MAZŮCK P. RAVENEL, M.D.
 CHARLES F. WILINSKY, M.D.

The *Journal* has been most fortunate in securing the services of Henry H. Kessler, M.D., of the Department of Labor, Newark, N. J., as Associate Editor in Industrial Hygiene, to take over the work of Dr. Hayhurst. Dr. Kessler has been a Member since 1927 and a Fellow since 1929.

WESTERN BRANCH A.P.H.A.

The Sixth Annual Meeting of the Western Branch will be held in Helena, Mont., July 1, 2, and 3. William F. Cogswell, M.D., Department of Health, Helena, is General Chairman.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

- Emily F. Bolcom, M.D., P. O. Box 1975, Los Angeles, Calif., Medical Director, Women's Venereal Disease Division, Los Angeles City Health Department
- Julius R. Bolles, M.D., Napoleon, Ohio, Henry County Health Commissioner
- Frank C. Cady, U. S. Public Health Service, Washington, D. C., Course of Study, National Institute of Health
- B. Booker Dalton, M.D., Rockingham, N. C., Richmond County Health Officer
- Alonzo E. Hardison, Jr., M.D., Jacksboro, Tenn., Associate Director, Anderson-Campbell County Health District
- E. M. Lucke, M.D., Court House, Hannibal, Mo., Marion County Health Officer
- Emile Martel, M.D., D.P.H., Amos, P. Q., Canada, Medical Director, County Health Unit
- Leo M. Michalek, M.D., Lackawanna, N. Y., Health Officer
- Wu Chi Moy, M.D., Chung Sun Memorial Library, Canton, China, Special Commissioner on Public Health
- Alton R. Perry, M.D., M.P.H., Natchez, Miss., Director, Adams County Health Dept.
- Albert Supple, M.D., 1401 Fair Oaks Ave., S. Pasadena, Calif., City Health Officer
- John M. Uhrich, M.D., Parliament Bldgs., Regina, Sask., Canada, Minister of Public Health
- George M. Wells, M.D., City Hall, Bowling Green, Ky., Director, Warren County Health Dept.
- Thomas B. Wilson, M.D., Box 1296, Longview, Tex., Assistant Director, Gregg County Health Unit

Laboratory Section

- Joseph L. Hileman, M.S., 810 Burnet Ave., Syracuse, N. Y., Chief of Laboratory Division, Dairymen's League Cooperative Assn.
- Robert A. H. Mackeen, General Hospital, St. John, N. B., Canada, Director of Laboratories

Vital Statistics Section

- Halbert L. Dunn, M.D., Ph.D., Univ. of Minnesota Hospitals, Minneapolis, Minn., Director, University of Minnesota Hospitals and Professor of Medical Statistics

Public Health Engineering Section

- Blair I. Burnson, B.S., 2079 Oakland Ave., Piedmont, Calif., Sanitary Department of East Bay Municipal Utility District
- Morgan D. Hayes, B.S., Rm. 52, City Hall, Rochester, N. Y., City Engineer
- William T. Ingram, A.B., 130 S. American, Stockton, Calif., Sanitary Engineer, San Joaquin Local Health District

Industrial Hygiene Section

- C. L. Jones, 1118 Delaware Trust Bldg., Wilmington, Del., Safety and Service Dept., Hercules Powder Co.
- Wendell Stewart, M.D., Murphy Bldg., East St. Louis, Ill.

Food and Nutrition Section

- James A. Berry, M.S., Frozen Pack Laboratory, U.S.B.P.I., Spokane St. Terminal, Seattle, Wash., Research Bacteriologist, Frozen Fruits and Vegetables
- Beth Konkel, Oklahoma City, Okla., Executive Secretary, Tuberculosis Society of Oklahoma City
- Fred V. West, Dr.P.H., 1801 La Cienega, Los Angeles, Calif., Director of Technical Service, Adohr Milk Farms

Child Hygiene Section

- Lester A. Gerlach, D.D.S., City Hall, Milwaukee, Wis., Dental Director

Public Health Education Section

- Fanchon Hart, B.S., 115 W. 68 St., New York, N. Y., Professor of Bacteriology, College of Pharmacy, Columbia University
- A. D. Lapp, M.B., Tranquille, B. C., Canada, Medical Superintendent, Tranquille Sanatorium

Don C. Lyons, D.D.S., 1405 National Bank of Jackson Bldg., Jackson, Mich., Author, Dental Section, Health and Hygiene Column, Univ. of Michigan and Affiliated Organizations

Epidemiology Section

John J. Hanlon, S.B., Department of Health, 3919 John R. St., Detroit, Mich., Statistician

Public Health Nursing Section

Elizabeth P. August, R.N., 50 E. Broad St., Columbus, O., General Secretary, Ohio State Nurses Assoc.

Helen Cochran, State Dept. of Health, State Office Bldg., Richmond, Va., Assistant Director, Bureau of Public Health Nursing

Joseph L. Daniel, R.N., Lawrenceville, Va., Research Worker, U. S. Public Health Service

Unaffiliated

Ralph I. Canuteson, M.D., 1638 Mississippi St., Lawrence, Kans., Director of Health Service, University of Kansas

C. P. Coogle, M.D., U. S. Public Health Service, Houston, Tex., Malarialogist

Reginald O. Davison, M.D., Dept. of Public Health, Parliament Bldgs., Regina, Sask., Canada, Deputy Minister

Sister Mary Edward, Dominican College, San Rafael, Calif., Librarian

Samuel S. Feuerstein, M.D., 42-15 34 Ave., Astoria, N. Y., Physician in active practice

NEWS FROM THE FIELD

BIRTH REGISTRATION CAMPAIGN

THE Bureau of the Census, with the aid of workers on the pay roll of the F.E.R.A., is carrying on a campaign which has for its primary purpose the education of the public regarding the importance of birth registration. Although it involves the post-card check customarily employed by the Bureau, the testing aspect is emphasized only as it relates to intra-state comparisons, the state health authorities being given to understand that there is no thought of checking their eligibility to remain in the registration area, that the purpose, on the contrary, is to assist them in securing the best possible registration within their state.

Campaigns in the following states have been conducted or provided for in the order here given: Georgia, West Virginia, Vermont, New Hampshire, Mississippi, Arkansas, Oklahoma, Missouri, Kansas, Iowa, South Dakota, North Dakota, Montana, Wyoming, Colorado, Utah, Idaho, Washington, Oregon, California, Nevada, North Carolina and Alabama. Other states may be added to the campaign plans in 1935.

In each state there is a publicity director on the F.E.R.A. pay roll, while the Census Bureau provides field representatives, each of whom supervises the checking in from one to three or four states.

One of the incidental benefits of the campaign is that it establishes a direct contact between the Bureau and the state authorities, such as has not always existed heretofore. Another is that it furnishes material for a study of effective methods of promoting birth registration; and also for a study of the problem of securing an accurate check on birth registration. It is expected

that a monograph or report will be prepared on each of these subjects.

In connection with this campaign it developed that a number of states have no adequate indexing of births and deaths, so that searches, if made at all, depend on certificates or journal entries arranged in chronological order. The Census Bureau has it in mind to select or devise a standard indexing procedure which may be recommended to those states which desire to introduce a system of indexing or to improve on one already in use.—A. W. H.

SMILEY HEADS NEW YORK STATE HEALTH EDUCATION

AN outstanding change in management of the health program in the schools in New York State occurred February 8, when Franklin Smiley, M.D., F.A.P.H.A., was inducted as director of the health and physical division of the State Education Department.

Dr. Smiley, who has won wide recognition during his 15 years as director of the health service at Cornell University, will collaborate with Dr. Frank P. Graves and a committee of the board of regents in an effort to improve the health of two million school children in the state. He will have the assistance of associated bureaus in the education department, as well as teamwork from such independent groups as the Mental Hygiene Department and the State Health Department.

In addition to being an author on health and physical education subjects, Dr. Smiley is chairman and secretary of the American Student Health Association and Associate Professor of Hygiene and Preventive Medicine at Cornell.

CERTIFICATE IN SANITARY INSPECTION

THE University of Southern California announces that it is offering courses leading to a Certificate in Sanitary Inspection.

Among the elective subjects suggested for completion of the Certificate are the following: Public health law, inorganic chemistry and qualitative analysis, sanitation and purification of water, organic chemistry, food products, general bacteriology, sanitary science, sanitary engineering, applied psychology, public relations, technical report writing and general zoölogy.

The tuition fee is low, and full information regarding the course may be secured by addressing W. Ballentine Henley, School of Government, 202 Wilson Building, Los Angeles, Calif.

ADULT EDUCATION

THE Tenth Annual Meeting of the American Association for Adult Education (66 East 42 St., New York) will be held in Milwaukee, Wis., May 20-22. Headquarters will be at the Hotel Schroeder. There will be sessions on public schools as adult education centers; adult education in rural communities; adult education under public auspices; vocational education and adjustment for adults; rural library service; avocational interests of adults; training community leaders; readability; and mechanical aids to learning.

Representatives of organizations with adult education programs and all other interested persons are cordially invited to attend the meetings.

TENTH PAN-AMERICAN SANITARY CONFERENCE IN BOGOTA IN 1938

AT the Ninth Pan-American Sanitary Conference held recently in Buenos Aires, it was voted to hold the Tenth Conference at Bogota in 1938.

Surgeon General Hugh S. Cumming, of the U. S. Public Health Service, was

reëlected Director General of the Pan-American Sanitary Office. Dr. Gregorio Araoz Alfaro, of Argentina, was elected Honorary President.

Other officers of the office are Dr. Carlos Enrique Paz Soldan of Peru, Vice-President; Dr. Carlos J. Mongo of Peru, Alternate Vice-President; Dr. Justo F. Gonzalez of Uruguay, Secretary; Dr. Rafael Schiaffino of Uruguay, Alternate Secretary.

Other members of the office are Dr. Solón Nuñez of Costa Rica, Dr. Francisco de P. Miranda of Mexico, Dr. Carlos Diez del Ciervo of Venezuela and Dr. Waldemar Coutts of Chile.

Dr. Jorge Bejarano of Colombia was elected organizing president.

NEW AND BETTER TUBERCULIN AIDS CATTLE-HEALTH CAMPAIGN

A NEW tuberculin, free from foreign protein, has been in use since last April in the testing of cattle for tuberculosis, the U. S. Department of Agriculture reports. The new product is materially superior to the tuberculin formerly available. Officials point out that the improvement came at a particularly fortunate time, since tuberculin testing has been increased as an emergency and drought relief activity, and more cattle have been tested in the last 8 months while the new tuberculin has been available than in any previous similar period of the campaign. Dr. M. Dorset, of the Bureau of Animal Industry, says that enough of the new tuberculin is being produced to test more than 18,000,000 cattle annually. U. S. Dept. of Agriculture, Jan. 24, 1935.

MOTHER'S DAY—MAY 12

A NATION - WIDE Campaign to make maternity safe has been planned by the Maternity Center Association, 1 East 57th Street, New York City. The climax of the effort will be timed for the week previous to Mother's Day, which falls this year on May 12.

PUBLIC HEALTH SERVICE ARRANGES
INSTRUCTION OF COUNTY HEALTH
OFFICERS

THE School of Hygiene and Public Health of The Johns Hopkins University has arranged, at the request of the U. S. Public Health Service, to offer a short course for candidates for appointment as County Health Officer. The course, which began February 6, covers a period of 12 weeks, of which 8 weeks will be spent in intramural work and 4 weeks in the field. Admission has been limited to applicants recommended by the health officers of the states, and appointed by the Public Health Service.

The instruction includes courses in public health, bacteriology, statistics, epidemiology, parasitology, sanitary engineering, and health administration. Dr. H. S. Mustard, Associate Professor of Public Health Administration, is in general charge of the course.—A. W. H.

CHEMISTS NOTE TERCENTENARY

FRANCIS P. GARVAN, president of the Chemical Foundation, has been named honorary chairman of the New York committee which will organize the celebration of the 300th anniversary of the founding of the nation's chemical industries.

The celebration will be held in New York in conjunction with the eighty-ninth meeting of the American Chemical Society, from April 22 to 26. According to Prof. Arthur W. Hixson of Columbia University, general chairman of the committee, more than 10,000 chemists and industrialists are expected to attend the meeting.

NATIONAL NEGRO HEALTH WEEK

THE twenty-first Annual Observance of National Negro Health Week will be from March 31 to April 7, inclusive. For full information, write National Negro Health Week Committee, U. S.

Public Health Service, Washington, D. C.

POPULAR LECTURES ON DOCTORS

UNDER the auspices of the Education Department of the Community Church, 550 West 110 Street, New York, Dr. Philip J. R. Schmahl, Professor of Medicine at Flower Hospital and N. Y. Homeopathic Medical School, will give a series of two lectures on "The Ceaseless Struggle Between Doctors and Death" (illustrated).

SAFETY RECORD

A RECORD of 9,166,135 consecutive man hours, without a lost time accident, is the record set up by the Western Clock Company of LaSalle, Ill. The National Safety Council thinks this is the outstanding industrial safety record of America.—*Am. Druggist*, Jan., 1935, p. 6.

PERSONALS

DR. HARRY B. SMITH has resigned from his position with the Connecticut State Health Department, to accept the position of Superintendent of Health, of West Hartford, Conn., following the resignation of Dr. Theodore F. Foster, member A.P.H.A., due to ill health.

DR. FREDERICK G. NOVY, Dean of the University of Michigan School of Medicine since September, 1933, announced his retirement effective at the close of the current semester. His resignation ends 48 years' association with the institution.

ETHEL JACOBS, R.N., of Albion, Ind., member A.P.H.A., has resigned from her position as Noble County Public Health Nurse to become the 7th E.R.A. advisory nurse on the staff of the Indiana Bureau of Public Health Nursing.

THOMAS J. DUFFIELD, member A.P.H.A., was appointed Registrar

of Records of the New York City Department of Health on January 16. The position of Registrar of Records had been vacant since the retirement of Dr. William H. Guilfooy in 1930 after 40 years of service.

Mr. Duffield brings to the office a varied experience in the field of public health and vital statistics. Following his graduation from the Massachusetts Institute of Technology with the class of 1914, he became Health Officer and Registrar of Vital Statistics in Summit, N. J., a post he left in 1917 to accept a commission in the Sanitary Corps of the Army. From this post, he resigned with the rank of Major, in 1919, after service at Camps Lee and Fremont in the United States, and in the office of the Chief Surgeon of the American Expeditionary Forces in France. He then became Statistician of the Commission for the Prevention of Tuberculosis in France, with headquarters in Paris, and in 1923, after a term as Instructor in Vital Statistics at the School of Public Health, Harvard University, he returned to Europe as a member of the Health Section of the League of Nations.

Returning to the United States in 1925, he served successively with the New York Commission on Ventilation, the New York Academy of Medicine and, since 1932, the Statistical Bureau of the Metropolitan Life Insurance Company.

DEATHS

DR. POWHATAN STANLEY SCHENCK, for 25 years Director of Public Welfare and Health of Norfolk, Va., died on January 24. He became a member of the Association in 1911, and was a Charter Fellow, but because of ill health resigned in 1931. He was 72 years old.

KATHRYN KERSH SCHULKEN, R.N., of

Denver, Colo., member A.P.H.A., died recently. She was Superintendent of the Denver Visiting Nurse Association from 1921 until her death. She was a member of the American Nurses' Association, of the National League of Nursing Education, of the National Organization for Public Health Nursing, and the American Association of Social Workers.

HARRY F. FERGUSON, Chief Sanitary Engineer of the Illinois State Department of Public Health, and member A.P.H.A., died January 16.

CONFERENCES

Mar. 27-29, Canadian Section, American Water Works Association, London, Ont., Canada.

March 31-April 7, National Negro Health Week—21st Annual Observance.

April 3-6, 8th Annual Convention, Southern Physical Education Association, Atlanta, Ga.

April 10-11, Montana Section of American Water Works Association, Helena, Mont.

April 11-12, Four States Section Meeting of American Water Works Association, Atlantic City, N. J.

April 24-27, National Convention, American Physical Education and its Eastern District Society, Pittsburgh, Pa.

April 29-May 3, 39th Annual Convention, National Congress of Parents and Teachers, Miami, Fla.

April 29-May 3, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.

May 12, Mothers Day.

May 6-10, Annual Convention of American Water Works Association, Cincinnati, Ohio.

May 20-22, Tenth Annual Meeting of the American Association for Adult Education (66 East 42 Street, New York), Milwaukee, Wis.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

April, 1935

Number 4

Epidemiology of Amebiasis*

J. C. GEIGER, M.D., F.A.P.H.A., G. H. BECKER, M.D., AND
J. P. GRAY, M.D.

Department of Public Health, San Francisco, Calif.

THE epidemiology of amebiasis in these United States has become the source of intense public health interest, particularly in the light of the 1933 Chicago experience. Regarded for many years as a widespread endemic tropical disease, one of the chief obstacles to colonization, and a cause of invalidism to public servants in the tropics, recent years have demonstrated that it is by no means limited to those regions, nor is it the problem it once was in these areas. Any comprehensive systematization of the points published by numerous investigators of the Chicago outbreak of 1933, leaves no doubt of the significant endemicity of this disease in America, and of the fact that public health authorities have a most formidable opponent especially in our older cities or those with large foreign populations of certain types.

Any casual study of the Chicago data brings up most forcibly the attention that must be paid to plumbing with its ubiquitous cross-connections. Previous experiences with this problem in typhoid

fever outbreaks have not entirely accomplished the desired results. Furthermore, the clinician must realize that amebiasis manifests itself in a much broader and more comprehensive picture than is generally allotted to it. Waiting for bloody mucous stools to appear before making a diagnosis and instituting treatment may be responsible for the increasing mortality, since such stools may occur only after considerable damage is done.

Since the discovery of *Entameba histolytica* by Loesch in 1875, autochthonous cases have occurred in various countries and continents. On the Pacific Coast, workers have long agreed that this type of infection is not so rare as is generally supposed, but the reasons for the discordance between frequency of amebic infection and recognition of the disease symptom complex has been a matter of conjecture. Certainly, water or uncooked foods can transmit the disease only when contaminated with fecal matter containing resistant encysted entameba. Epidemiologically, the source of these must be latent cases or carriers. It is accepted that cysts may be passed in large numbers in the stools of carriers, and therefore these probably constitute the

* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

most important source of infection. Theoretically, amebiasis is at least a preventable disease, but it is not always practicable or convenient to take into the gastrointestinal tract only substances sterilized by heat.

It is theoretically desirable that all carriers of *Entameba histolytica* undergo treatment, but this may not prove feasible on a large scale, mainly because of the expense involved and particularly because many carriers, despite the technical thoroughness of the examination, may remain undiscovered. With the discovery of the carrier state, the treatment of carriers and their elimination from duties involving the handling of foods served raw, of equal importance is the proper disposal of excreta, since infection is spread through the transference of cysts from the feces to foods and their subsequent ingestion. Evidence has been adduced that cysts may remain viable in fecal matter for 1 week, and that they live longer in the formed than in the liquid stool. Intestinal zoöparasitism in the presence of improper sewage disposal, as cross-connections or siphonage returns from the sewage to water systems, may lead to infections by bizarre methods. Among these may be listed: allowing cyst contaminated water to enter the mouth while bathing, or to enter the rectum as in the use of enemata, or through washing with polluted water the raw vegetables used in salads.

As most modern water systems carry some residual chlorine the work of Bercovitz¹ on the viability of cysts becomes of decided importance. This author worked on the hypothesis that the use of septic tanks in China would solve the problem of the use of human feces as fertilizers, provided the treatment could be modified or supplemented by chemical disinfectants in order to destroy the cysts of intestinal parasites. The cysts were destroyed by 1 per cent solutions of bichloride of mercury or

formalin and by half strength brine after exposure for a maximum period of 1 hour, but not by 1 per cent solutions of acetic acid, chlorinated lime and sodium hydroxide, or by 70 per cent alcohol. The use of hematoxylin stains after treatment was found of more value than eosin in determining the viability of cysts.

The recent work of Spector² and her associates indicates very definitely that the *E. histolytica* cysts are removed completely from water by coagulation and filtration through rapid sand filter beds, and that the amount of chlorine required to kill cysts is much more than could be used in a public water supply. The viability of the cysts in water is therefore of importance. Walker³ and his coworkers kept cysts moist as long as 10 days at tropical temperatures and parasitization subsequently occurred. Darling kept cysts in sterile tap water for 3 days; they degenerated or disappeared and parasitization did not occur in kittens. Schaudinn parasitized kittens with cysts air dried for 6 weeks, but not with those dried for 7 weeks. Dobell⁴ concluded that under artificial (cultural) conditions free ameba of *E. histolytica* may survive room temperature up to 3 days, but at 37° C., may survive for at least 5 weeks. The cysts, however, can remain alive at room temperature for at least 37 days, but usually die within a few days if kept at body temperature.

Presumably water, air, certain temperatures, and the secretions of the stomach provide adverse environmental conditions for the cysts and they will perish if they do not gain access to the human bowel. All cysts do not possess the same viability. The cysts present in carriers' stools may be extraordinarily numerous, a daily output having been estimated to be as high as 3 million, which would permit even microscopic particles to carry the infection. Epidemiologically, the disseminating agents

are food handlers, who carry the infection to food and drink by means of the soiled hands and clothing, transmitting cysts from the toilet to washstand, bathtub, laundry tub, and towel. The cycle would be ideally completed in the presence of cross-connections permitting siphonage between the sewage and the water systems, or by gravity flow through a submerged water supply to a plumbing fixture. Apparently this did occur in the more or less closely associated community which existed in certain hotels in Chicago. The reported absence of other enteric diseases ordinarily associated with water-borne outbreaks involving contamination by sewage, is, however, contrary to epidemiologic expectations. An observation by Musgrave indicated that cold temperatures stimulate the parasite to form cysts more rapidly, and this presumably could occur in the water supplies of hotels, particularly if they are refrigerated. This observation may have to be qualified since he may have been dealing with ameba other than *E. histolytica*.

O'Connor and Weynon, in their work in Egypt, found the largest number of carriers of *E. histolytica* among food handlers and prisoners. The soil under certain conditions may be considered a natural habitat and these authors' findings may be explained on the basis of gross soil pollution and insanitary conditions in the institutions. Vegetables from contaminated soil offer an easy means of dissemination, but this should not occur in the United States.

The cyst carrier offers the greatest problem. It is perfectly true that continuous exposure to carriers occurs quite often without infections, at least without clinical manifestations of infection, and these occasions offer epidemiologic difficulties. For example, a freighter ship recently sailed from Manila in which there were two carriers of *E. histolytica* in the kitchen personnel.

To the crew of 40, there were enroute approximately 9,000 exposures, but in only 1 instance was amebic infection demonstrable; and indeed there is some evidence that this infection may have been acquired ashore.

In this connection, Walker's³ classical experiments in Manila, in which *E. histolytica* was fed to human beings, are of more than passing interest. Of 20 men who ingested *E. histolytica*, 17 became parasitized following the first feeding, and 1 required 3 successive feedings, although all had been prepared with magnesium oxide as a neutralizing agent against the acidity of the gastric secretion. It is doubtful if parasitization would have occurred had they not been so treated. The lapse of time from ingestion of infectious material to the appearance of entameba in stools varied from 1 to 44 days, with an average of 9 days. Of great importance is the fact that of the 18 men experimentally parasitized, only 4 developed dysentery and these were infected with cysts from healthy carriers. The incubation periods were 20, 57, 87, and 95 days. This latency is characteristic of the disease, and such latent infections may follow adjuvant causes, such as fatigue, alcoholic excesses, chilling, etc., but may be entirely due to the chronicity of the ulcerative process. Walker concludes that the chief, if not the exclusive, sources of infection lie in the chronic latent cases or carriers, because of their relative prevalence. Added difficulties arise in the facts that the condition exists indefinitely, the parasitization is unsuspected for years, and the carriers shed continuously or intermittently enormous numbers of cysts.

Kessel⁵ stated that the parasite may at times live in the lumen of the intestine in commensalism and under certain conditions may become a tissue invader; also that it is significant to remember that the entameba living in

the lumen which have ingested bacteria only, when transferred to kittens are invasive and produce dysentery. Moreover, the so-called "small" races of *E. histolytica* produce as severe infections and as extensive pathology as the "large" races, and are therefore probably just as pathogenic. The resistance of the host appears to be a more important factor in the production of clinical amebiasis than the alleged differences in virulence. Higgins asserts that repeated passages increased the virulence but that the accompanying bacteria also played a rôle in the acceleration of the virulence, at least for the production of liver abscesses.

Walker's feeding experiments on human beings were obviously reproduced on a large scale in certain Chicago hotels. Under these conditions, persons returning to their homes throughout the United States were parasitized following their residence in these hotels. It may be significant that no similar outbreak occurred elsewhere and that the epidemiologic problems involved in the spread of the disease and in parasitization were therefore peculiar to Chicago. Perhaps also these conditions were even more limited, being confined to a small area within the city proper. Furthermore, the number of infections in proportion to the number of exposed must have been small, especially when compared to other enteric diseases, or amebiasis is less easily transmitted. The latter hypothesis is probably the deciding numerical infection factor.

Any measurement of the rôle of carriers in the spread of amebic dysentery in a city such as Chicago is unusually difficult. Perhaps, as the epidemiological study and protozoan survey of Williamson, Kaplan, and Geiger,⁶ indicates, the data are unreliable because observations and reports by local physicians are incomplete. Significant data show that amebiasis is by no means restricted to prescribed geographic en-

demic areas. The disease is evidently indigenous to the Middle West, as reported by Brown,⁷ who concludes that "the wide distribution of *Entameba histolytica* must be appreciated by physicians and public health authorities." The problem is inseparably connected with the introduction of large numbers of immigrants from areas in which high parasitic indices obtain. The Chicago data of 1929 are especially interesting in that the carriers discovered were handling food in large hotels, and 64 per cent of them were foreign born. The physician should regard obscure cases of intestinal disease with suspicion and look for the etiological possibility of *E. histolytica*. The health officer has a great responsibility in that he must recognize this problem and initiate appropriate measures for the control of this menace. When such important work as the search for carriers has once begun, no break in its continuity should be permitted.

The importance of this statement is shown in the more recent Chicago experience. The monthly average number of reported cases of amebic dysentery for the City of Chicago is approximately 2, and the annual average for the 3 years 1930, 1931, 1932, was 18. The statistical epidemiologic methods used by the Chicago Department of Public Health are not unlike those of the San Francisco Department of Public Health, which permit of immediate knowledge of appreciable changes in the epidemic indices in the various reportable diseases under observation.

From the published data⁸ the reporting of cases of amebic dysentery in Chicago in 1933 showed nothing of unusual importance until the month of August. The epidemic index as expressed in per cent, or ratio between the normal expected incidence and the actual reported incidence, suddenly mounted to 650, increased to 700 in September, and went as far as 1,400

in October. The very abruptness of this rise in August could have been considered as a warning of no slight significance and an indication for unstinted diligence in rigorous epidemiologic investigation in an effort to discover the probable source or focus of infection. These and subsequent published data of the health authorities in Chicago are ample evidence of this diligence.

Bishop and Bishop⁹ in a study of amebiasis occurring endemically in New York City, concluded that the actual incidence is probably far greater than is commonly supposed, and these authors felt that more attention should be paid to the search for carriers. Faust's¹⁰ data, obtained in protozoan surveys, very definitely indicate the presence of an appreciable amount of *E. histolytica* infection in the population of Wise County, Va., and New Orleans, La. In fact, 4.3 per cent positive specimens were found in 460 persons examined in the former place, and 10 per cent among 172 in the latter.

Reed and his associates,¹¹ in a protozoan survey of 1,000 prisoners at San Quentin Prison near San Francisco, demonstrated 92 per cent infestation. The San Francisco Department of Public Health in coöperation with Reed, has just completed a survey of food handlers in hotels and clubs in San Francisco. Of the 400 persons examined, 3.7 per cent, or 14, were found to be positive for *E. histolytica*. The records failed to show that any of these were responsible for the infection of the cases reported, although careful epidemiologic investigation into the probable source of infection is always made. Also, it should be pointed out, no cross-connections between the sewage and water systems of these hotels and clubs existed.

Previous protozoan surveys made in the United States by Kofoed and his associates, and by Stiles and Boeck,

demonstrated an appreciable amount of parasitism.

The statistical data quoted as a result of observations and protozoan surveys are illuminating but neither conclusive nor exact. The status of the term "amebic dysentery" as to whether reference is made to the carrier state or to a clinical case, is most obscure and perhaps chaotic. Apparently, physicians do not consider the disease as reportable, and even if so, the term "amebic dysentery" is not considered as including the all important carrier state. Obviously, the public health significance of this disease in the United States, with especial reference to the accuracy of statistical summaries of reported incidence, rests with the reports of physicians. That amebiasis is more widespread than once thought or the available reports indicate, should engage the best efforts of the conscientious health officer to determine its real status and danger in the community.

For reliable data, more than one fecal examination in each individual studied is required in every protozoan survey; the same dictum obtains in the clinical diagnosis of the acute case. Furthermore, extreme care must be exercised in the examination of fresh stools and stained specimens for ameba, and full appreciation must be held for the technical knowledge and skill required for recognition of the parasite. In an effort to detect the carrier state, stool specimens from convalescents from amebic dysentery should be examined for *E. histolytica* at frequent and regular intervals. Likewise, the rôle played by the carrier of *E. histolytica*, especially in food handlers in hotels, restaurants, clubs and other public eating establishments still remains an unknown quantity in the epidemiology and spread of the disease in large population centers of the United States, especially where the migration of new immigrants from

known endemic areas is continuous. To these epidemiologic possibilities there has been added through published observations such animal reservoir hosts, as rats, mice, dogs, domestic pigs, and perhaps others, including the monkey. The mechanical transmission by the house fly can be acknowledged but only in areas where the lack of sanitation allows easy accessibility to human feces.

Three matters are of paramount importance, especially in the light of the Chicago experience: (1) the examination of food handlers for the carrier state in amebic dysentery; (2) the probable reason for the localized accelerated virulence; and (3) the administrative problem of proper sewage disposal. Perhaps the carrier state in amebiasis is analogous to what has occurred in the carrier state of other diseases which often has food as its vehicle of infection. The term, "once a carrier, always a carrier," might well have been applied to some of those examined in 1927 in Chicago, and their activities as food handlers forever terminated.

Since the rôle of human carrier has been clearly shown, it would appear that there is ample justification for the search for the carrier state among food handlers as a preventive or control measure. The routine examination of all food handlers presents certain definite difficulties.

The carrier state is frequently intermittent rather than constant. Unless the specimens are obtained under well regulated circumstances, the possibilities of falsification of source are manifestly a possible, and indeed a probable, source of error. The cost of the medical and laboratory examination, if properly carried out to include all possibilities and follow-up, is probably greater than the results of such a search warrant. The expense of setting up a departmental organization, so that the examination may be more nearly uniform

and standardized, is considerable, and official agencies cannot easily demand a fee for such service unless the scope of the examination is extended to include the desirable points of the periodic health examination. In the larger population centers, particularly, such a practice would assume proportions approaching certain types of state or social medicine, and such a program should be avoided. On the other hand, the individualism of medical practice could not supply the public health official with uniform interpretation of findings, and the practice of accepting certificates of private practitioners would not afford the desirable uniformity of standard. The inclusion of the private laboratories, with a certain amount of individualism in technic, also complicates the reliability of the data furnished from nonofficial sources and increases the complexity of the entire program.

The laboratory examination, of itself, offers a greater field of usefulness than the medical examination alone. To be of value, however, the specimens should be from bona fide sources, should have been obtained under controlled conditions, and should be delivered at the laboratory as soon as possible, in good condition, properly labelled. If these circumstances obtained, the results of the laboratory work have definite and important significance; if not, the results of the most careful work are subject to criticism and question. The methods used should be standardized to insure uniform technic, but it must be remembered that the procedures of a decade ago are not suited to present-day requirements. It is highly desirable that the laboratory personnel have an inherent desire constantly to improve the laboratory methods, so that full advantage may be taken of the work of others. Elaborate equipment is not demanded by most improvements in technic, but unless the proper mental

attitude is present in the worker, even elaborate equipment is of little value as an incentive.

Whether food handlers on ships, in hotels, clubs and restaurants should be examined as a prerequisite to employment is open to argument. It would seem more rational that physicians report their cases of amebiasis more promptly and that the Department of Public Health, as the official agency, investigate the probable source of infection with diligence and intelligence, and arrange for the immediate removal of the carrier from food handling, with surveillance over his or her future activities.

The acceleration of the virulence of the organism in Chicago in 1933 appears to be a clinical fact. The reason for this, if it is at all possible to assign any, can be argued only from the evidence which has been presented, on the basis of purely clinical findings and on assumed epidemiologic theories. From the clinical standpoint, the severe type of infection, in which there was reported a high frequency of gangrene of the intestine, with the malignant type of dysentery, would indicate a type of amebiasis heretofore unencountered in the United States. Careful analysis of the detailed tabulations of symptoms and signs and laboratory findings in all cases would be more than interesting. Such data are not available.

Theoretically the apparent epidemiologic exaltation of amebiasis in Chicago may have been due to mass infections or to some superimposed virus of an allied or totally unlike disease. In any event, the Chicago experience may be repeated in other localities and this possibility offers a problem of intriguing complexity to the health official. The determination of the number of permanent carriers resulting should prove of intense interest, for it is highly probable that these will materially increase the inci-

dence of amebiasis throughout the United States.

This increase, however, should not reach even near epidemic proportions in any community, provided the lessons learned in Chicago are not forgotten by health authorities. Moreover, it is not inconceivable that the conditions of cross-connections and siphonage between the sewage and water systems as found in certain hotels in Chicago, or by gravity flow through submerged water supplies to plumbing fixtures, can be duplicated in many communities. The existence of such conditions, however, will stand as an everlasting indictment of the non-enforcement of existing plumbing laws, or demonstrate woful lack of the necessary and essential technical sanitary engineering knowledge which is so remarkable in some departments of public health, even today.

REFERENCES

1. Bercovitz, Nathaniel. Viability of cysts of human intestinal amoebas as determined by exposure to various substances, and subsequent staining in hematoxylin. *Univ. Calif. Publications in Zoology*, 26:249-261, 1924.
2. Spector, Bertha Kaplan, Ph.D. Effectiveness of filtration in removing from water, and of chlorine in killing, the causative organism of amoebic dysentery. *Pub. Health Rep.*, 49:786-800 (July 6), 1934.
3. Walker, Ernest Linwood, with the cooperation of Sellards, and Watson. Experimental entamoebic dysentery. *Philippine J. Sci.*, 8:253, 1913.
4. Dobell, C. Further observations and experiments on cultivation of *Entamoeba histolytica* from cysts. *Parasitology*, 19:288-313 (Sept.), 1927.
5. Kessel, John F. Amoebiasis in kittens infected with amoebae from acute and carrier human cases and with tetranucleate amoebae of the monkey and of the pig. *Am. J. Hyg.*, 8:311-333 (May), 1928.
6. Williamson, Charles Spencer, M.D.; Kaplan, Bertha, M.S.; Geiger, J. C., M.D. A survey of amoebic dysentery in Chicago. *J.A.M.A.*, 92:528-531 (Feb. 16), 1929.
7. Brown, Phillip W., M.D. The treatment of endamebiasis, especially with stovarsol. *Illinois M. J.*, 49:410-413 (May), 1926.
8. Bundesen, Herman N., M.D.; Rawlings, Isaac D., M.D.; and Fishbein, William I., M.D. The Health Hazard of Amoebic Dysentery: Report of an Outbreak. *J.A.M.A.*, 101:1636-1639 (Nov. 18), 1933.
9. Bishop, Louis F., and Bishop, Louis F., Jr. A study of amebiasis in New York City. *Am. J. Trop. Med.*, 9:297-307 (Sept.), 1929.
10. Faust, Ernest Carroll. The *Entamoeba coli* index of *E. histolytica* in a Community. *Am. J. Trop. Med.*, 10:137-144 (Mar.), 1930.

Clinical Amebiasis in Relation to Public Health*

ALFRED C. REED, M.D

Professor of Tropical Medicine, University of California, San Francisco, Calif.

AVAILABLE evidence indicates that between 6 and 12 million persons in the United States are subjects of amebiasis. Such figures at once raise the amebiasis problem to the dignity of major public health interest. From this standpoint, there must be considered the direct death rate, the incidence and mortality of complications, the direct sickness and disability rate, the depression of physical vigor with its concomitant lowering of social and physical efficiency, and the increased susceptibility to other diseases. Data are insufficient to make any fair quantitative estimate of these various items. That the sum total is large and important, can be safely inferred from consideration of the clinical and pathologic features of amebiasis, and from analogy with other widespread chronic diseases such as hookworm infection and malaria. In this presentation it is our concern to analyze the situation and to deduce the best practical methods of control. Amebiasis is considered strictly as human infestation with *Endameba histolytica*.

CLINICAL AMEBIASIS

E. histolytica must be considered primarily, and perhaps entirely, a tissue

parasite. Invasion of the human body takes place solely by ingestion of cysts. In the terminal small intestine, these excyst and release active amebae which tend to invade the mucosa of the colon. Rarely there is invasion of the terminal ileum. Dobell¹ has shown that excystment and encystment can take place in the same surroundings. The first site of election is the cecum. From here the infection may overflow or spread lower in the colon as the amebae are carried along by the colonic flow. They naturally penetrate the mucosa where mechanical conditions favor, as in the flexures, lower sigmoid and rectum.

In the tissue a characteristic pathology is produced by a process of gelatinous necrosis. Callender² describes this as follows:

In both the gland layers and the sub-mucosa the lesions are characterized by the lysis of tissue and the absence of reactive or inflammatory phenomena. . . . While it is possible that the destruction of the mucosa over a considerable area may precede and be the method of formation of the amebic ulcer, the more probable stages in the formation consist in the progression of the amebae to the sub-mucosa along vessels and lymphatics, and the formation of small areas of cytotoxicity (amebic abscesses), their discharge on to the surface, their involvement in secondary infection by bacteria of the intestinal lumen and the gradual extension of the ulcer partially as a result of a secondary infection but particularly as a result of the peripheral lytic action of the ameba. If the secondary infection is of a mild nature, symptoms may be almost entirely lacking. . . . Destruction of

* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

a vessel wall by the ameba may lead to a frank hemorrhage, and thus for the first time call attention to the pathological process in the intestine. The principal point needing emphasis is that the amebic lesion is one showing characteristic changes of the activity due to the parasite, cytolysis, and practically no reaction on the part of the tissues until secondary infection occurs when the reactive phenomena are due to that secondary infection and not to the parasite.

The amebic pathology calls attention to 3 clinical points³:

(1) The lesion may penetrate deeply in the intestinal wall, even reaching the serosa. This may result in adhesions, deep pockets and granulomatous masses. It also explains the facility with which amebae may reach the lymph and blood capillaries. (2) Sooner or later secondary bacterial infection of amebic lesions takes place. This leads to important clinical considerations, such as production of fever, complications in symptomatology, lack of clinical cure with specific treatment, and residual, often permanent, bowel damage after eradication of amebae. It also affords a portal of entry for systemic bacterial invasion, thus acting as a true focal infection. (3) The host-parasite balance is of the utmost importance. Granting the presence of amebae, the optimum condition for the host is where the amebic colonies are not extending, and where bacterial infection is absent. The optimum for the ameba is where the bowel is not disturbed in its physiology. Diarrhea and dysentery are easily excited if the amebae become more active. Diarrhea results in decrease or absence of cyst formation and in extrusion of active trophozoites which promptly die. Thus clinically diarrhea is associated with presence of active amebae and disappearance of cysts, causing interference with transfer of cysts to a new host.

The writer⁴ has divided clinical amebiasis into 7 types, based on the pathology already described, which are classified according to the clinical picture and indications for treatment:

1. Dysentery with acute, malignant onset and course—This requires immediate diagnosis and treatment. Fever and prostration are often present and the frequent bowel movements are attended by severe colic and bleeding.

2. Amebic diarrhea or dysentery with sub-acute onset and course—This is the

ordinary type of amebic bowel disturbance. It tends to become chronic or to show irregular exacerbations.

3. Chronic uncomplicated intestinal amebiasis—This includes the so-called "carrier" state, and the condition of recurrent or mildly persistent symptoms. It is the most frequent type in this country. Almost always secondary bacterial infection which requires treatment in itself is present.

4. Extra-intestinal amebiasis, which, for practical purposes, consists chiefly of hepatitis and liver abscess. Abscesses in other organs and ulceration of the skin, especially contiguous to sinuses, are less frequent.

5. Amebiasis complicated by other infections, by systemic diseases, and by surgical conditions—Bacillary dysentery may coexist or the amebic dysentery may mask cancer or colonic tuberculosis. There is reason to believe that amebic lesions may act as true foci of bacterial infection, allowing entry into the circulation of bacteria, bacterial products, and other chemical substances from the large intestine. Surgical complications, including granulomas and abscesses, are not uncommon, especially following the recent Chicago epidemic. Operation in the presence of active, untreated amebiasis is exceedingly dangerous. Proper and safe treatment depends on early diagnosis not later than at the time of surgical intervention in the abdomen. Amebic lesions easily simulate peptic ulcer, cholecystitis, appendicitis, perforation, gangrene and new growth, or they may coexist with such conditions. Operation in the presence of such an untreated amebic lesion is dangerous and may result in fatal perforation or gangrene of the bowel. "It is to be remembered that surgical complications may appear early in a first acute attack, or late in cases insufficiently treated; also that they may be discovered unsuspected at operation, or operated upon without

recognition, or operated upon under a wrong or incomplete diagnosis."

6. Sequelae of amebiasis include various types of chronic colitis, sprue, cancer, chronic infections such as tuberculosis, residual ulcers, and colitis maintained by bacterial infection, and mechanical defects such as stricture and scarring. Effective early treatment is the best preventive for these sequelae.

7. Toxic results of drugs used, must be considered seriously, as all too often an unjustified treatment hazard is added to the disease hazard, as discussed by Anderson.⁵ Toxic drug symptoms must be clearly distinguished from the symptoms of amebic disease.

Together these 7 types make up the clinical picture of amebiasis. This comprehensive picture, based on the pathology and natural history of *E. histolytica* makes the incidence of amebiasis strikingly important in its public health aspects.

Diagnosis of amebiasis is fundamentally important for 2 reasons: (1) On it depends efficient treatment and removal from society of a source of amebic infection. (2) It is the only sound basis for accurate reporting and public health control. Diagnosis rests solely on microscopic identification of *E. histolytica* by a competent technician. Comparatively few technicians are competent to make this diagnosis. It is a procedure definitely requiring special training. A wrong diagnosis is more dangerous than none at all. It should be a part of the general public health program to set up a method of accurate diagnosis, available to all practitioners. Such a method has been described by Reed and Johnstone.⁶ In brief, a thin fecal smear is made on a slide with a small paste brush, and, with care to avoid drying, is put at once in Schaudinn's solution as a fixative. The slides are then sent to a central laboratory, either in Schaudinn's solution or in 70 per cent alcohol, where the iron

hematoxylin staining can be completed and the slide examined. This method has the advantages, (a) of allowing immediate stool examination, thus preserving both cysts and trophozoites; (b) of allowing accurate identification of a fixed preparation; and (c) of affording a permanent slide-record of the diagnosis. The sending of stool specimens by mail is not satisfactory because all motile forms disappear and cysts begin to lose their characteristics after 48 hours.

Treatment of amebiasis has been summarized by Reed.⁴ It is only necessary to note carbarsone as the drug of choice, given by mouth, except in acute dysentery, where rectal use gives quicker control. Vioform has also been used orally with excellent results. In amebiasis of the liver, in surgical complications and for control of malignant acute dysentery, emetin remains the drug of choice. Emetin is dangerous and therefore must always be used with circumspection.^{4, 7, 8, 9} It should never be given intravenously, and the total dosage by any and all routes of administration must not exceed 10 mg. per kilo. Proper treatment of amebiasis depends on correct and early diagnosis. It is essential for public health control and for the immediate as well as the ultimate health of the patient. Every person harboring *E. histolytica* should be effectively treated. This is even more important in chronic, largely symptom-free cyst passers than in acute dysentery because only cysts transmit the infection. The cyst-passer is a danger both to himself and to his fellows.

INCIDENCE AND EPIDEMIOLOGY

James,¹⁰ in 1928, reviewed surveys of the incidence of amebiasis in England, and in North and South America up to 1927. He concluded that the data, so far as presented by authoritative observers, indicated an incidence of 5 to 10 per cent in the general population,

where amebic dysentery is not endemic, and a higher rate where dysentery is endemic. James's experience in non-dysenteric cases was that trophozoites alone were found, without cysts, in 50 per cent. If the same ratio holds in temperate climates as in Panama, James believes that the actual incidence rate, based on examination for cysts alone, should be doubled. He rightly says that a parasite infecting 5 to 20 per cent of the general population deserves attention. He infers that the pathogenicity of *E. histolytica* in temperate climates is inversely proportional to its relative incidence.

Reference may be made to the surveys reported since James's summary (see Table I).

Differences chiefly in methods, selection of groups, geography, and urbanization make it impossible to construct an exact numerical summary of these data. In general they confirm rather than refute James's estimate of a minimal incidence in North America and Europe of 5 to 10 per cent of the general population. For the United States this means a minimum of 6 to 12 million persons infected. In comparison with other infections and parasitic diseases, amebiasis thus assumes major public health importance.

Study of the figures quoted indicates a probable minimal rate in cities and a maximal rate in rural districts. Combined with the experience of the Chicago epidemic, the conclusion seems justified that the incidence of amebiasis is directly proportional to lack of effective disposal of feces. This is related to higher rural incidence and also to city outbreaks which are due to sanitary defects or breakdowns. This general proposition is modified by the influence of contamination of food supplies by cysts from food handlers, by mechanical transfer by insects or dust, and by contamination of foods eaten raw which have been fertilized

with human excreta. These latter methods of infection are results of a personal or individual lapse or breakdown of proper sanitary disposal of feces. We have to consider, then, two major aspects of the public health problem: one concerned with sanitary sewage disposal, both urban and rural; the other with personal hygiene in two particulars—personal cleanliness, especially after defecation, and protection of food and drink from accidental contamination with cysts. The rural problem is much more difficult to control.

It is obvious that every person harboring *E. histolytica* has swallowed human fecal material. For that reason, there is to be expected a correlation between the incidence of other intestinal protozoa, especially *Endameba coli*, and of *E. histolytica*, as has been demonstrated by various workers, in New Orleans by Johns²⁴ and by Faust,²⁶ and in Tennessee by Meleney.²⁵

Experiment and observation agree that transmission of amebiasis is by cysts alone. It has been taught too generally that cysts are found only in formed stools and motile forms only in the presence of dysentery or diarrhea. That this is not true was proved among others by Reed,²⁸ who found in a study of 50 cases in San Francisco that 38 had motile amebae, and of these 3, or 8 per cent, had neither diarrhea nor dysentery. Also in the earlier malignant Chicago cases, cysts were not infrequently found in dysenteric stools. It cannot be assumed that invariably there is no danger of transmission from patients with diarrhea or dysentery, nor that the absence of these symptoms makes certain that only cysts will be passed.

Dobell¹ has shown that cysts of *E. histolytica* can remain alive at room temperature at least 37 days, whereas at body temperature they generally die within a few days. Wight and Wight²⁹

TABLE I

<i>Author</i>	<i>Location</i>	<i>Type of Examinees</i>	<i>Number Examined</i>	<i>Number of Examinations</i>	<i>Per cent E. histolytica</i>
Williamson, Kaplan and Geiger ¹¹	Chicago	Hotel food handlers	1,148	?	2.35
Philipitschenko ¹²	Leningrad	Food employees	400	1	22.75
Philipitschenko ¹²	Leningrad	O.P.D. non-dysenteric	162	1	25.3
Philipitschenko ¹²	Leningrad	Child clinic patients	42	1	9.5
Philipitschenko ¹³	Leningrad	Intestinal in-patients	225	(1 in 173 cases)	14.2
Craig ¹⁴	Army Hospital, Washington, D. C. (?)	In-patients	689	1 or 2	11.2
Andrews and Paulson ¹⁵	Baltimore	O.P.D. gastrointestinal	522	..	by stool exam. 0.2
Milam and Meloney ¹⁶	Rural group, Jackson County, Tenn.	75 complete families	374	..	this low rate unexplained 38.0
Bach ¹⁷	N. W. Germany	Excludes intestinal	1,000	..	5.7
Meloney, Bishop, and Leathers ¹⁸	Rural Tennessee, 69 counties	General population	20,237	1	22.8
Johnstone, David, and Reed ¹⁹ *	San Quentin Prison, Calif.	Prisoners, cross section of state, new admissions only	1,000	3	9.2
Arnett, Wenrich, and Stabler ²¹	Philadelphia	Unselected college freshmen	401	with iron hematoxylin 1	4.5
Dougherty ²²	Atlanta	Private patients	1,103	..	5.0
Johns and Tripoli ²³	Louisiana	At large	544	..	7.44
Johns ²⁴	New Orleans	Private patients	199	cul. & micro.	9.0
		Medical students	181	"	8.3
		Charity Hosp. O.P.D.	234	"	7.26
Meloney ²⁵	Rural Tennessee	At large	4,987	1	17.3
Faust ²⁶	Wise County, Va.		460	6	45.4
	New Orleans area		172	6	27.9
Svensson, quoted by Faust ²⁶	Sweden, 1928	Hospital cases	611	corrected	3.4
	Sweden, 1928	Asylum cases	1,244	to	21.4
	Finland, 1928	Out-patients	159	6	20.0
Riley, quoted by Faust ²⁶	Minnesota, 1929	Ex-service men	about 500	exams.	1.9
Creswell and Wallace ²⁷	Tacoma, Wash.	Transient men	358	1 with concentration	11.7
Creswell and Wallace ²⁷	Tacoma, Wash.	Food handlers	408	"	1.2
Creswell and Wallace ²⁷	Tacoma, Wash.	Physicians	40	"	2.5
Creswell and Wallace ²⁷	Tacoma, Wash.	Insane food handlers	100	"	2.0
Creswell and Wallace ²⁷	Tacoma, Wash.	Private patients	126	"	7.9

* These cases were consecutive new admissions to the prison, and therefore not "institutional" cases, in which, as Bock and Siles ²⁰ and others have shown, the incidence tends to be higher than in the general population.

have extended Dobell's limit to 46 days. Persistence of viability, however, requires suitable and sufficient moisture. Manson-Bahr³⁰ states, ". . . as cysts of *E. histolytica* can only survive on a moist medium, there is a considerable amount of evidence, experimental and epidemiological, that amebic infection is mostly water-borne." It is known that the cysts may remain viable in water for at least 2 or 3 weeks, while they are easily killed by desiccation, as stated in 1922 by Dobell and Low.³¹ Spector and Buky³² have shown that when human hands were heavily contaminated with infected fecal material and allowed to dry at room temperature, practically all cysts were dead in 5 minutes, and it was exceptional that any survived beyond 10 minutes. It is evident that contamination of food must occur under conditions of sufficient moisture both on the carrying agent and in the food, to prevent drying of the cysts. This emphasizes the importance of washing and drying the hands invariably and immediately after defecation, and of taking particular care to avoid handling moist or liquid foods without this procedure. It throws light on the relation of humid climate to persistence and spread of amebiasis. From this standpoint, amebic incidence becomes a function of the interrelation between humidity of climate, sufficient local moisture to preserve cysts, character of personal hygiene, public sanitary state, and presence of amebic cyst passers. Personal hygiene in turn becomes a function of the interplay of intelligence and sanitary education. In such a summary, it is evident that the easiest natural conditions for transmission will be afforded by accessibility of water supply to cyst contamination, as happened in Chicago. Under such conditions, building up of carrier reservoirs, increased virulence by faster transmission³³ * and mass infection easily

follow and together would seem to explain the epidemiologic and clinical peculiarities of the Chicago outbreak. Here was seen a true epidemic of malignant amebiasis, previously unknown in temperate climates and not fully appreciated in tropical climates. On the other hand, the summary given explains the nearly universal endemic or sporadic occurrence of amebiasis, for it is to be remembered, as Dobell and Low³¹ phrase it, that amebiasis seems to exist wherever there are human beings, and that it is probable that its greater prevalence in warm climates is related more to the question of sanitation than of climate.

We have next to consider the relation of the infected food handler to clinical amebiasis. Such a relation rests chiefly on theoretical and epidemiological grounds. Careful and conclusive studies are inadequate so far to show direct contamination of food under practical conditions by the hands of food handlers. The same remarks apply to the question of family infection.

Milam and Meleney¹⁶ report an intensive study of a rural community in Jackson County, Tenn., including 75 families with 374 persons. These people lived mainly on their own crops, lacked sanitary privies, and were under an isolated, pioneer social organization. Thirty-eight per cent carried cysts of *E. histolytica*. The high infection rate can be correlated directly with the social and sanitary offenses present. Meleney²⁵ carefully surveyed 5 families, comprising 27 individuals of whom

* J. G. Thomson²³ says, "From my experience of this disease, and of all diseases caused by protozoan parasites, I am convinced that the causal organism may vary in its virulence to a very appreciable extent. Further it seems to me that this question of virulence in the case of *E. histolytica* depends to a great extent on the facility and rapidity with which it can pass from host to host. Put shortly, the severity of the disease between the extremes of the acute and the chronic, symptomless, carrier form, is directly related to the frequency with which the individuals in a community are exposed to repeated, intensive and massive infections."

23 were infected with *E. histolytica*. He concluded that the mother was probably the source of spread because she was the chief "food and child handler." He found poor sanitation and hygiene, and low intelligence to be important factors. It would be difficult to say that all amebic patients are of low intelligence but it is certain that a fault in personal hygiene is invariably involved. Where such faults are combined with low intelligence or sanitary ignorance, we see the problem of the infected food handler and housewife assuming major proportions. In all of these situations we come back to the root of the problem in the clinical cyst-passer.

This analysis brings into view two types of clinical control which are potential major public health methods of control: (1) the effective treatment of all amebiasis patients, (2) the perfecting of personal hygiene, including sanitary education, to a point which will reduce the hazard or probability of infection. It is to be remembered that carriers of amebae should be instructed in social hygiene and, in the absence of proper social conformity, should be subjected to restrictive measures, as advised editorially in the June issue of this *Journal*.³⁴ These restrictive measures should at least apply to food handlers and housewives. The problem of control must not be abandoned because of the difficulties involved.

The problem of animal reservoirs needs further study. Monkeys, pigs, and dogs have been suggested by Kessel³⁵ as possible hosts of *E. histolytica*. A survey by Frye and Meleney³⁶ revealed cysts in house-fly droppings and in pigs. Little is known as to the relation to human infection but there is little or no evidence that such transmission occurs or that animal strains are infective for man.

Within the field of epidemiology lies also the question of isolation of patients

and carriers. Here common sense agrees with available knowledge, that isolation is inadvisable in either case.³⁷ Again, personal hygiene and good sanitation are sufficient. Reference must be made to the important and debatable matter of pathogenicity of *E. histolytica*.

We believe that insufficient attention has been accorded to study of predisposition to amebic infection. Craig⁴² in numerous articles, has discussed immunity and complement fixation. It would seem that the obverse is equally important. Various workers as McCarrison,³⁸ and Dunn,³⁹ have called attention to the rôle of deficient vitamin supply in chronic diarrhea and in amebic dysentery. A similar relation to mineral metabolism has received comment by Cantarow⁴⁰ and others. There are sufficient suggestive data to justify a careful, large-scale study, as to the relation between depressed social conditions including unbalanced dietary, and the incidence, and especially the pathogenicity of *E. histolytica*. The bearing on public health is direct and fundamental. Amebiasis may be favored by such factors. In any case, it results in lowering of resistance to other infections and tends to reduce physical and mental vigor. These factors are also related to the extreme chronicity of the amebiasis and its peculiar tendency to exacerbations and relapses. Manson-Bahr⁴¹ states that this may be one of the most persistent of all protozoan infections.

PUBLIC HEALTH CONTROL

It is undoubtedly true, as Milam and Meleney¹⁶ have indicated, that there is little or no correlation between carrier incidence and dysentery incidence, and that amebiasis does not warrant direct special public health measures for its immediate reduction, but this does not at all mean that a definite program should not be formulated for control. Routine examination of all food

handlers for *E. histolytica* is impracticable because of the expense involved, the difficulty of providing sufficient reliable technicians and the uncertainty as to the intrinsic value of the method. Adequate regional surveys of food handlers are much needed in the effort to evaluate the importance of food handlers in spreading amebiasis.

The most important feature of public health control is accurate and complete reporting by physicians of cases of amebiasis. McCoy³⁷ has stressed this point in detail. It is incongruous, to say the least, that the California State Board of Health requires report of "Amebic Dysentery" only, and not of "Amebiasis." Correct reporting is based on availability, and use by physicians, of proper methods for quick and correct diagnosis. The health officer has then to watch his indices of incidence, and follow up any increase of endemic index with an immediate intensive survey of the local area involved. This method seems fully adequate to control the amebiasis problem from the public health standpoint. Its effectiveness rests entirely on accurate and complete reporting by physicians. This in turn necessitates education of physicians in the nature of clinical amebiasis. Too many physicians are ignorant of the clinical and diagnostic features of amebiasis, and its treatment. Until this condition is corrected, control will continue to be inadequate. The old struggle to develop a sanitary sense in the general public must go along with the education of physicians. A popular demand for clean food, clean dishes and utensils, clean kitchens, clean waiters and other food handlers, safe water supplies, absence of flies and insects where food is handled, clean hands and fingers, and the availability and enforced use of sanitary toilets and wash-bowls—such a demand would go far to control the amebiasis problem and with it many other related problems.

CONCLUSION

The incidence, direct effects, and indirect results of amebiasis make necessary a definite public health program with reference to it. This program should consist of (1) education of physicians, (2) education of the public, (3) accurate reporting and close watch of endemic indices, (4) provision of diagnostic facilities, and (5) intensive control of infected areas. Such a program easily coördinates with other health policies and programs and is within the practical range of expense.

REFERENCES

1. Dobell, C. Further Observations and Experiments on the Cultivation of *E. histolytica* from Cysts. *Parasitology*, 19:288 (Sept.), 1927.
2. Callender, G. R. Differential Pathology of Dysentery. *Am. J. Trop. Med.*, XIV:207 (May), 1934.
3. Reed, A. C. Amebiasis—A Clinical Summary. *California & West. Med.*, XL:6 (Jan.), 1934.
4. Reed, A. C. The Treatment of Amebiasis. *J.A.M.A.*, CIII:1224 (Oct. 20), 1934.
5. Anderson, H. H. Amebiasis: Important Aspects of Treatment. Read before the California State Medical Society, May 3, 1934; to appear in *California & West. Med.*
6. Reed, A. C., and Johnstone, H. G., Method for Diagnosis of Amebiasis. *J.A.M.A.*, XCIX:729 (Aug. 27), 1932.
7. Anderson, H. H., and Reed, A. C. Untoward Effects of Anti-amebic Drugs. *Am. J. Trop. Med.*, 14:269 (May), 1934.
8. Rinehart, J. F., and Anderson, H. H. Effect of Emetin on Cardiac Muscle. *Arch. Path. & Lab. Med.*, XI:546, 1931.
9. Reed, A. C. Emetin and the Treatment of Amebic Colitis. *Am. J. Med. Sci.*, CLXXXI:553, 1931.
10. James, W. M. Some Observations on Intestinal Amoebiasis due to Infection with *E. histolytica*. *XVI Ann. Rep. Med. Dept. United Fruit Co.*, 1927, p. 127. Also in *Ann. Intern. Med.*, II:171 (Aug.), 1928.
- Human Amoebiasis due to Infection with *E. histolytica*. *Ann. Trop. Med.*, XXII:201 (Aug. 28), 1928.
11. Williamson, C. S., Kaplan, B., and Geiger, J. C. A Survey of Amebic Dysentery in Chicago. *J.A.M.A.*, 92:528 (Feb. 16), 1929.
12. Philpitschenko, A. A. Occurrence of Intestinal Protozoan Infections in the Inhabitants of Leningrad (U.S.S.R.) etc. *Ann. Trop. Med.*, 24:165 (July 8), 1930.
13. Philpitschenko, A. A. *E. histolytica* and other Protozoa in 225 Cases Acute Aestival Diarrhea, etc. *Ann. Trop. Med.*, 24:177 (July 8), 1930.
14. Craig, C. F. Diagnostic Value of Complement Fixation Test in Amebic Infections. *J.A.M.A.*, 95:10 (July 5), 1930.
15. Andrews, J., and Paulson, M. Incidence of Human Intestinal Protozoa, etc. *Am. J. M. Sci.*, 181, 102 (Jan.). 1931.
16. Milam, D. F., and Meleney, H. E. Investigations of *E. histolytica* in Tennessee. II. *Am. J. Hyg.*, 14:325 (Sept.), 1931. (Continued on next page)

17. Bach, F. W. Untersuchungen über die Verbreitung parasitischer Darmprotozoen, u.s.w. *Ztschr. f. Hyg. und Infektionskrankh.*, 113:321 (Jan. 16), 1932.
18. Meleney, H. E., Bishop, E. L., and Leathers, W. S. Investigations of *E. histolytica* and other Intestinal Protozoa in Tennessee, III. *Am. J. Hyg.*, 16:523 (Sept.), 1932.
19. Johnstone, H. G., David, N. A., and Reed, A. C. Protozoal Survey of 1,000 Prisoners, etc. *J.A.M.A.*, 100:728 (Mar. 11), 1933.
20. Boeck, W. C., and Stiles, C. W. Studies on Various Intestinal Parasites of Man. *Bull. Hyg. Lab., U.S.P.H.S.*, 133, 1923.
21. Arnett, J. H., Wenrich, D. H., and Stabler, R. M. A Survey of 401 College Freshmen for Intestinal Protozoa. *Am. J. Trop. Med.*, XIII:311 (May), 1933.
22. Dougherty, M. S. Amebiasis a Public Health Problem in the Cities of the Southern United States. *Am. J. Trop. Med.*, XIII:317 (May), 1933.
23. Johns, F. M., and Tripoli, C. J. Incidence of Infection with *E. histolytica* in Louisiana, etc. *New Orleans M. & S. J.*, 82:224 (Oct.), 1929.
24. Johns, F. M. Cultural Methods and Direct Microscopic Examination in Diagnosis of Pathologic amebae. *South. M. J.*, XXIII:236 (Mar.), 1930.
25. Meleney, H. E. Community Surveys for *E. histolytica* and other Intestinal Protozoa in Tennessee. *J. Parasitol.*, XVI:146 (Mar.), 1930.
26. Faust, E. C. The *E. coli* Index of *E. histolytica* in a Community. *Am. J. Trop. Med.*, X:137 (Mar.), 1930.
27. Creswell, S. M., and Wallace, C. E. Amebiasis—Survey of 1,032 Stool Examinations. *Northwest Med.*, XXXIII:165 (May), 1934.
28. Reed, A. C. Amebiasis—A Clinical Summary. *California & West. Med.*, XL, 1 (Jan.), 1934.
29. Wight, T., and Wight, V. On the Viability of Cysts of *E. histolytica* under Variable Conditions. *Am. J. Trop. Med.*, XII:381 (Sept.), 1932.
30. Manson-Bahr, P. H. Manson's Tropical Diseases. Wood & Co., 1929, p. 419.
31. Dobell, C., and Low, G. C. Amebiasis, Chapter in *Practice of Medicine in the Tropics*, by Byam & Archibald. Oxford Press (Eng.), Vol. II:1345, 1922.
32. Spector, B. R., and Buky, F. Viability of *E. histolytica* and *E. Coli*. *Pub. Health Rep.*, 49:379 (Mar. 23), 1934.
33. Thomson, J. G. Human Entamoebiasis in Temperate Zones. *J. Stat. Med.*, XXXIII:563 (Dec.), 1925.
34. Editorial, The Medical Examination of Food Handlers. *A.J.P.H.*, XXIV:645 (June), 1934.
35. Kessel, J. F. Amebiasis—Etiology. *California & West. Med.*, 41:46 (July), 1934.
36. Frye, W. W., and Meleney, H. E. Investigation of *E. histolytica*, etc., in Tennessee; IV, A Study of Flies, Rats, Mice and Some Domestic Animals as Possible Carriers. *Am. J. Hyg.*, 16:729 (Nov.), 1932.
37. McCoy, G. W. Control of Amoebic Dysentery. *Pub. Health Rep.*, 49:359 (Mar. 16), 1934. See also, McCoy, G. W., Amoebic Dysentery, Problems Presented by Outbreak in 1933. *Pub. Health Rep.*, 49:141 (Feb. 2), 1934.
38. McCarrison, R. Influence of Deficient Diets on Monkeys. *Brit. M. J.*, 1:249 (Feb. 21), 1920, and numerous other papers.
39. Dunn, T. B. Amebiasis. *China M. J.*, XLIII:564 (June), 1929; *ibid.*, XLI:607 (July), 1927.
40. Cantarow, A. Calcium Metabolism and Calcium Therapy, II Edit. Lea & Febiger, 1933, p. 154.
41. Manson-Bahr, P. H. On the Symptomatology of Intestinal Amebiasis. *Lancet*, CCXVII:1028 (Nov. 16), 1929.
42. Craig, C. F. Observations on Hemolytic, Cytolytic and Complement-binding Properties of Extracts of *E. histolytica*. *Am. J. Trop. Med.*, 7:225 (July), 1927. Also, Complement Fixation in Diagnosis of Infections with *E. histolytica*; *ibid.*, 8:29 (Jan.), 1928; also, Same Title. *Proc. Nat. Acad. of Sci.*, 14:520 (July), 1928; also, Technique and Results of Complement Fixation Test for Diagnosis of Infections with *E. histolytica*. *Am. J. Trop. Med.*, 9:277 (Sept.), 1929.

Meningitis Quarantine—District of Columbia

ABOUT 1,700 transients were placed under quarantine by health authorities, February 6, because of an outbreak of spinal meningitis, newspapers reported. One death occurred on February 7. About two-thirds of the number were released February 14, but about 300 were still confined because cases had developed in the lodging

houses in which they were quartered. All transient lodging houses were quarantined. About 450 men quartered in small hotels under contract were brought back into the lodges, but those living in private homes were not affected by the ban.—*J.A.M.A.*, 104, 10:840 (Mar. 9), 1935.

Laboratory Diagnosis of Amebiasis*

K. F. MEYER, M.D., AND H. G. JOHNSTONE

*George Williams Hooper Foundation, University of California,
San Francisco, Calif.*

THE recent widespread discussion of amebiasis in both the medical and lay press has again focussed attention on the everlasting importance of correct and early diagnosis. With bewildering frequency new procedures and interpretations have been recommended and the novice is frequently tempted to overcome his shortcomings by trying every method without really acquiring proficiency in one. It is true that the final medical diagnosis is merely aided by the protozoological findings, but in amebiasis the proper identification of the causative organism is of greatest importance. Time and time again such experts as Dobell and James have repeated the axiom: If the microscopic diagnosis of amebiasis cannot be made correctly, then it should not be made at all. Since the diagnosis rests solely upon the microscopic recognition, differentiation, and identification of *Endameba histolytica* in a complex environment, it is obviously essential that those entrusted with the examination shall be competent observers, equipped with special training, technical skill, and experience. The examination for amebae should be confined to certain laboratories staffed with a personnel which can critically study the specimens submitted. Experience and observations during the past 25 years justify the

conclusion that the diagnosis of amebiasis is not the function of the average laboratory.

The essential steps required to make a correct diagnosis may be considered under the following headings: (1) Collection, selection and shipment of material for examination; (2) Concentration; (3) Preparation of stool specimens for examination; (4) Microscopic examination of stained preparation; (5) Cultural examination; (6) Pathogenicity tests; and (7) Complement fixation test.

COLLECTION, SELECTION, AND SHIPMENT OF MATERIAL FOR EXAMINATION

For many years the necessity of studying only absolutely fresh stools has been recognized. This essential prerequisite is usually ignored, and the microscopist encounters many additional difficulties which he would not meet in the study of fresh stool material. In old fecal specimens the motile forms disintegrate, the cysts lose their differential characteristics, and coprozoic forms make their appearance. A large percentage of patients with amebiasis, even in the absence of diarrhea, show motile amebae, together with cysts. Reed (1934) points out that it has been the consensus of opinion that outside of the tropical zone amebic dysentery is infrequently found and that motile forms are associated closely with diarrhea or dysentery; and in the absence of diarrhea or dysentery cysts are to be ex-

* Read at a Joint Session of the Laboratory and Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

pected. However, in a group of 50 patients he found that 36 per cent showed dysentery and 76 per cent motile amebae. He further points out that if 76 per cent of the cases showed motile amebae, and if stool examination had been limited to cold specimens sent to the laboratory in the usual containers on the same or succeeding days, it is certain that in a majority of the series the diagnosis would have been missed. James (1926) stresses the fact that in about one-half of the histolytica infections seen by him only vegetative forms were found. Motile amebae die quickly and immediate fresh examination of stool specimens or immediate fixation of fresh fecal samples should be resorted to. In an old stool one is apt to encounter numerous active protozoa; it is highly probable that they developed in the stool after it was passed. These are the troublesome free-living coprozoic forms which are introduced into the feces by contamination after passage, or gain access to the alimentary canal in the encysted state, from the air or by the intake of food or water. Andrews (1930) lists 6 members of the Sarcodina and 4 of the Mastigophora which may be encountered in an old stool. To obviate the difficulties enumerated, it has been our practice to have the patient produce the specimen on the premises or in the hospital, and the necessary examinations and preparations are made as soon as possible. In cases where the specimen has to be brought from the hospital or home into the laboratory by the patient, clean paraffined cardboard drug-cans are supplied.

The selection of the proper fecal material for examination is most important. If the stool is not homogeneous, smears should be made from both the formed and unformed portions, and especially from those parts containing flakes of mucus or blood. The evacuation should be normal and not induced by purgatives. Castor and mineral oils should be

avoided as they complicate the microscopic picture. The more drastic purgatives should likewise be avoided, since liquid stools are unsatisfactory—in fact useless. To obtain a soft stool without purgation James (1926) recommends a mild laxative. Kofoed suggests bile salts or *fel bovis*; Haughwout (1930) a full dose of strychnine sulphate, fluid extract of cascara in very moderate dosage or a laxative dose of Carlsbad water, and Reed and Johnstone (1932) Epsom salts in small amount.

An ideal method used many years ago is now again recommended. (Fradkins 1934)—the collection of suitable specimens with the aid of the sigmoidoscope. The proctoscopic examination exposes the ulcers and with a long handled small curette or a camel's hair brush scrapings may be removed which lend themselves to the preparation of excellent slides at the bedside. At times when amebae were not demonstrable in the stools they were found in specimens taken from the scrapings of ulcers obtained through this instrument. Manson-Bahr and Gregg (1921), in view of the fallacies and shortcomings of microscopic diagnosis, advocate the routine use of the sigmoidoscope. Brown (1926), Abd-el-Azim (1930), Paulson and Andrews (1927), and Reed and Johnstone (1932), have all obtained excellent results by the use of this instrument. Willoughby (1928), supporting the practice of sigmoidoscopy, believes that mere swabbing of a lesion is ineffective and holds that amebae can be more certainly obtained by scraping the lesion with a long-handled curette. This procedure deserves wider application since the specimens can be collected at the convenience of the physician.

The shipment of stools to the laboratory should be discouraged. The methods of James, Kofoed, Reed, and Johnstone, which depend on the preparation of wet smears at the bedside,

enable the physician to mail specimens over long distances. Any physician or health worker can keep on hand the few solutions needed and any public health laboratory can furnish suitable containers. Fecal smears prepared directly from the patient are fixed in Schaudinn's solution, then transferred to alcohol, in which they are shipped to the laboratory. For survey work this method is most effective and time saving. It is needless to emphasize the absolute necessity of repeated stool examinations. The number of amebae, both in the motile and cystic phases, occurring in stools from a patient taken on successive days varies to such an extent that it is almost obligatory to make more than one examination. An excellent rule to make at least 6 examinations before a patient is declared free from intestinal protozoa should be adopted.

Manson-Bahr (1921) believes that if a series of cases be examined once each, about one-third of the infections present would be disclosed. In a series examined 3 times, between one-half and two-thirds of the actual number of infections would be detected. Brown (1926), in a survey of 533 cases, found that the positive findings occurred in 68 per cent of the first, 92 per cent of the second, and 98 per cent of third examinations. By using reasonably fresh material and examining the permanent preparations James (1926) expresses the view that in trained hands the positive findings in amebiasis can be raised on the first examination to 75 per cent. According to his experience the second examination, when the first had been negative, raised the percentage to 90. Recently Andrews (1934), in making a comparison of the occurrence of intestinal protozoa from purged and normally passed stools, found that the examination of single purged stools revealed, conservatively estimated, at least 75 per cent of the protozoan species which would have been ulti-

mately discovered, but it must be emphasized that the data published by Andrews were secured by the simple smear test technic with saline and iodine solution and not by the wet-fixed permanent method.

CONCENTRATION

In many instances, cysts occur in fecal specimens in such small numbers that they are detected with great difficulty, and only following the examination of several stools. In order to obviate this difficulty concentration methods have been devised. Yorke and Adams (1926) perfected a simple technic which requires no special reagents. They suggest, in addition, an alternative method for the concentration and washing of concentrate when the cysts are to be used for starting cultures. A much shorter method has been described by de Rivas (1928). The homogeneous suspension of fecal material in 5 per cent acetic acid is mixed with ether and centrifuged. The cysts, if present, will be found in the sediment at the bottom of the tube. This method cannot be used in cultivation work due to the presence of the reagents.

The use of concentration methods as a regular routine procedure, to the exclusion of the more reliable methods (wet-fixed permanent preparations or cultural), is not recommended. Creswell and Wallace (1934), in 1,032 stool examinations used the method of de Rivas followed by the iodine-eosin stain. They admit that although this efficient concentration method was used, perhaps 10 to 20 per cent of the cases were missed. These concentration methods are too strenuous for the vegetative or motile forms which are either completely destroyed or so distorted that recognition is impossible.

PREPARATION OF STOOL SPECIMENS FOR EXAMINATION

In exceptional instances, and then

only when the examiner is an experienced protozoölogist, should fresh unstained stool preparations be employed. James's conclusions that in fresh material a diagnosis cannot be made except by those with long special training who are thoroughly familiar with the elements of microscopy, is amply verified by others. Even the expert may encounter difficulties in identifying *E. histolytica*. If not selectively stained the cells of the inflammatory exudate may be mistaken for amebae.

For preliminary examinations of fresh smears either Kofoed's (Kofoed *et al.*, 1919) modification of Donaldson's iodine-eosin stain or MacDaniels's (1934) methylene blue-methyl alcohol stain can be used. The latter stain is in many ways superior to the iodine and eosin solutions. The whole preparation can be searched with the low power objective in a very short time as the trophozoites and cysts are easily detected as clear refractile bodies in the dark blue field. Under higher power the details of the nuclear structure in organisms stained by this method are more clearly differentiated than in those stained by iodine-eosin. In routine laboratory examinations much time and labor is saved by discarding all stools which fail to reveal intestinal protozoa in the preliminary stained preparation. A definite diagnosis is made on the permanent preparations which have been made from the stool, showing organisms in the fresh smears.

The method of choice in the laboratory diagnosis of amebiasis remains the preparation of wet-fixed, wet-treated, and hematoxylin stained permanent fecal smears.

Comparatively few laboratories make any attempt to prepare satisfactory permanent preparations for the diagnosis of suspected cases of amebiasis. Why this is so is rather difficult to understand as the necessary technic is no more involved and the labor required

no more time-consuming than in many routine staining procedures. The method most commonly used for the preparation of permanent smears is the fixation (hot or cold) of wet smears in Schaudinn's fluid followed by a mordant of iron alum and stained in hematoxylin.*

MICROSCOPIC EXAMINATION OF A STAINED PREPARATION

The microscopic scrutiny of a stained preparation must consider (a) the type of the cellular exudate; (b) the various protozoa which occur in the human intestinal tract, and (c) the plant and animal cells of the food detritus commonly noted in the stools.

The careful examination of the cellular exudate of stools will often prove of invaluable assistance in the diagnosis of amebiasis. In many instances where amebae have not been found on the first examinations the characteristic cellular exudate has indicated their presence, resulting ultimately in the discovery of the organisms. The principle underlying this cytodagnostic method is stated by Haughwout (1930) as, "The cellular exudate from the bowel is a replica of the histopathology of the condition." The basis for comparison and differentiation of the dysenteries (bacillary, amebic, and balantidial) rests on the fact that the cells of the bowel wall react differently to the attacks of the invading organisms. The methods and questions concerned with the cytology of bowel exudates are fully discussed in the papers by Willmore and Shearman (1918), Anderson (1921), Woodcock (1920), Haughwout (1924 a, b, c, 1930), Haughwout and Callender (1925), and lately by Callender (1934).

The inflammatory exudates often contain leucocytes and macrophages containing red blood corpuscles and showing ameboid movement. If not

* For further information regarding procedure consult the author.

selectively stained these macrophages may be mistaken for amebae even by trained workers. The addition of double iodine solution to fresh preparations, in order to tinge selectively the nuclei of the amebae, is not a reliable procedure. Wet fixation and differential staining is indispensable. It is perhaps true that in cases of active dysentery, the large motile trophozoites are readily recognized, but as is generally the case, especially in survey work for latent infections, the precystic or cystic phases predominate. These latter may readily be confused in fresh preparations with corresponding phases of the other species of amebae often found in the intestinal tract concomitantly with *E. histolytica*. In accepting the observations made on permanent preparations as standards, James (1926) concluded that the percentage of error in the examination of fresh specimens with especial reference to the occurrence of *E. histolytica* was too high for accurate clinical work. In fact, it is often difficult to differentiate the amebae even in permanently stained preparations. The permanent preparation has the additional advantage that it serves as an excellent record which can be filed and produced at will.

As stated, the examination of fecal material for intestinal protozoa is not an easy task and the difficulties encountered are numerous. The examination generally resolves itself into determining not what is *E. histolytica* but what is not *E. histolytica*. This statement appears paradoxical but when one considers the countless numbers of objects of both plant and animal origin encountered in a fecal smear, it is evident that the chances for confusion are manifold. *E. histolytica* is only 1 of the 5 species of amebae living in the human intestinal tract; to mistake it in all of its phases for various phases in the life cycles of the other 4 is a simple matter. The intestinal flagellates often are con-

fusing, *Blastocystis hominis*, intestinal epithelial cells, large macrophages containing red blood corpuscles and polymorphonuclear leucocytes are additional pitfalls encountered. Thomson (1926), and Thomson and Robertson (1929) describe and figure in detail the common pseudoparasites occurring in the feces of man which are so puzzling to the observer. Experience is a paramount prerequisite which will protect the examiner from making improper interpretations and grave errors of diagnosis.

CULTURAL EXAMINATIONS

Many workers have stressed the value of the cultivation of *E. histolytica* in diagnosis. St. John (1926) obtained a higher percentage of positive results by culture than by the direct examination of the feces. Craig and St. John (1927), in a comparative survey of 3 methods of examination on 71 individuals, found that the cultural method gave a higher percentage of positives than did either the direct microscopic examination or the sedimentation test. They did not clearly state however, whether the direct microscopic examination was made from fresh smears or permanently by stained preparations. The culture method is of advantage especially when a large increase in the number of amebae is desired. In order to detect cryptic, occult, or hidden infections referred to by Thomson and Robertson (1929) the culture methods may be recommended.

The preparation of the culture media and the making of the cultures are by no means simple. Many media have been suggested. For ordinary diagnostic work Craig's (1930a) simple normal salt-serum medium is satisfactory, but if the cultures are to be maintained for any length of time a medium such as Locke's-egg-blood (L. E. B.) should be used. Kofoed and McNeil (1932) have pointed out the advantages of this for

the maintenance of various species of intestinal protozoa in culture for long periods. The organisms obtained in the cultures must be carefully studied in wet-fixed smears in order to avoid mistakes in diagnosis. Permanent preparations from culture material are difficult to prepare and in routine diagnostic work time consuming. The sediment removed from the culture tube is mixed with a drop of sterile rabbit or sheep serum or a small amount of stool that has been previously shown to be negative for protozoa. Excellent permanent preparations may thus be secured. It is important to note that in studies on the cultivation of *Endameba gingivalis* from the human mouth, Kofoed and Johnstone (1929) found the morphological characteristics of the oral amebae prepared from cultures and stained in permanent preparations decidedly changed. In view of these and similar experiences it is doubtful if the cultural methods offer many advantages over the simple routine procedure of permanently stained preparations of carefully collected stool specimens.

PATHOGENICITY TESTS

Present-day knowledge concerning the pathogenicity of amebae for such remote hosts as the kitten may be of interest scientifically, but the variable incubation time, and the technical difficulties fail to increase the accuracy over the usual diagnostic procedure. As an aid in distinguishing bizarre protozoological findings, the pathogenicity test on carefully controlled monkeys may be considered.

COMPLEMENT-FIXATION TESTS

Mainly due to the studies of Craig it has been demonstrated that specific complement fixing bodies are to be found in the blood serum of individuals infected with *E. histolytica* when alcoholic extracts of cultures of this organism are used as antigens. Craig

(1927, 1928a and b, 1929, 1930b, 1933), in a series of contributions, described the technic employed in the test and the practical application of it in the diagnosis of human cases of amebiasis. He used a human hemolytic system, the sera were inactivated at 56° C. for ½ hour, and the antigen was an alcoholic extract of 48 hour old cultures of *E. histolytica* grown on the Boeck-Drbohlav medium. The test was not considered positive unless a 3 or 4 plus reaction was obtained on a 4 plus scale. Craig (1933) concludes, following an analysis of the results of the test in 1,000 individuals that:

1. Normal individuals, or those suffering from other infections or diseases do not give a positive complement-fixation reaction with the prepared antigen unless there is a coincident infection with *E. histolytica*.

2. The specific complement fixing bodies disappear from the blood serum following anti-amebic treatment and the disappearance of *E. histolytica* from the feces.

3. In relapsing cases of amebiasis the complement-fixation test, which has been negative during the interval of apparent freedom from *E. histolytica*, again becomes positive in rare instances even before the parasite is again demonstrable in the feces. Thus, a negative reaction, unless repeatedly so for several weeks does not prove the absence of amebic infection or that anti-amebic treatment has resulted in cure.

4. The time of disappearance of the positive complement-fixation reaction after treatment resulting in the disappearance of *E. histolytica* from the feces varied between 3 and 28 days.

5. Individuals infested with other species of amebae, or with the intestinal flagellates, do not give a positive complement-fixation unless *E. histolytica* is also present.

6. The complement-fixation reaction

occurs in all stages of amebiasis, but the strongest positive results are usually obtained in symptomless "carriers" or in those presenting mild symptoms of infection with *E. histolytica*. In several cases of very acute amebic colitis the reaction has been doubtful or negative, although in most severe cases the reaction has been positive.

7. The test has proved of value in the diagnosis of cases of amebic abscess of the liver unaccompanied by intestinal symptoms; in the diagnosis of apparently healthy "carriers" of *E. histolytica* and of those presenting atypical or mild symptoms of infection; and in the control of anti-amebic treatment.

A survey of the work of Craig as well as the infrequent studies of other confirming observers shows that the complement-fixation test in amebiasis is highly specific and is of value in the diagnosis of amebiasis especially in the hepatic type and other stages of latent infection. However, one must agree with Craig (1933) when he states:

Where the services of a trained protozoologist are available and it is possible to make repeated microscopic examination of the feces in suspected cases, this test would be of comparatively little help in diagnosis, as I am convinced that every case of intestinal infection with *Endameba histolytica* can be diagnosed by microscopic examinations of the feces, provided repeated examinations are made, if necessary.

The practical application of the complement-fixation test is greatly limited. The preparation of an efficient antigen is difficult as cultures have to be continuously maintained over long periods to supply the necessary material. In addition Craig (1929, 1930b) has pointed out that not all of his extracts possessed antigenic properties. He often obtained inert extracts from the same strain of *E. histolytica* that had previously given, and afterward gave, excellent antigenic extracts although the inert ones were made in the same manner as the active.

SUMMARY

1. The following axiom must be recognized: If the microscopic diagnosis of amebiasis cannot be made correctly it should not be made at all. Since the diagnosis rests solely upon the microscopic recognition, differentiation and identification of *Endameba histolytica* in a complex environment, it is obviously essential that those entrusted with the examinations are competent observers equipped with special training, technical skill, and experience. In fact, it is recommended that the examinations for amebae be confined to certain laboratories properly equipped, and with a personnel which can critically study the specimens submitted. The diagnosis of amebiasis is not the function of the average laboratory.

2. Although the experts have recognized for many years the necessity of studying only absolutely fresh stools, this essential prerequisite is usually ignored. In old stool specimens, the motile forms disintegrate, the cysts lose their differential characteristics, and coprozoic forms make their appearance.

3. Equally important is the selection of the proper fecal material for examination. The evacuations should be normal. If not otherwise obtainable, a mild purgative may be used. Liquid stools are unsatisfactory and useless. It is important that different portions of the stool be selected in the preparation of the smears. This is particularly desirable when stools of variable consistency are submitted for examination.

4. With the aid of the sigmoidoscope, specimens may be secured admirably suited for a search for amebae. The proctoscopic examination exposes the ulcers, and with a long handled small curette or a camel's hair brush scrapings may be removed which lend themselves to the preparation of excellent slides at the bedside. This method deserves wider application.

5. The shipment of stools to the laboratory should be discouraged. The methods of James, Kofoid, Reed, and Johnstone, which depend on the preparation of wet smears at the bedside, enable the physician to mail specimens to the laboratory over long distances. Fecal smears prepared directly from the patient are fixed in Schaudinn's solution, then transferred to alcohol in which they are shipped to the laboratory. For survey work, this method is most effective and time saving.

6. It is needless to emphasize the absolute necessity of repeated stool examinations. At least 6 successive daily examinations should be carried out before a patient is declared free from infection.

7. In exceptional instances, and then only when the examiner is an experienced protozoologist, should fresh unstained stool preparations be employed. The method of choice in the laboratory diagnosis of amebiasis remains the preparation of wet-fixed, wet-treated and hematoxylin stained permanent fecal smears. Selective or differential staining of the wet preparation is most essential. The majority of modern methods have fully taken care of this aspect of the diagnosis.

8. The various concentration methods may be useful in the hands of a skillful worker. They are time consuming, and since they rarely surpass in accuracy the wet-fixed preparations or the cultural methods, they have no place in the regular routine examinations.

9. In order to detect cryptic or hidden infections, the cultural methods may be recommended. The preparation of the culture media and the making of the cultures are by no means simple. The organisms obtained in the cultures must be carefully studied in wet-fixed preparations in order to avoid mistakes in diagnosis. By comparison, it is doubtful if the cultural methods offer many advantages over the simple routine procedure of permanently stained preparations of carefully collected stool specimens.

10. The microscopic scrutiny of a stained preparation must consider—(a) the type of cellular exudate, (b) the various protozoa which occur in the human intestinal tract, and (c) the plant and animal cells of the food detritus commonly noted in stools. Experience is a paramount prerequisite which will protect the examiner from making improper interpretations and grave errors in diagnosis.

11. Present-day knowledge concerning the pathogenicity of amebae for such remote hosts as the kitten may be of interest scientifically but it fails to increase the accuracy of the usual diagnostic procedure. As an aid in distinguishing bizarre protozoological findings, the pathogenicity test on monkeys may be considered.

12. The complement-fixation test, although specific and of value in the diagnosis of hepatic amebiasis and various other stages of latent amebic infection, is technically exceedingly difficult. Its use is limited on account of the great variability of the antigenic extracts and other irregularities inherent to the complement-fixation test of protozoan infections. One must agree with Craig, who believes that the fixation test is not needed provided a trained protozoologist can examine repeatedly properly collected and stained stool specimens.

BIBLIOGRAPHY

Abd-El-Azim, M. The Diagnosis of Amoebic Dysentery. *J. Egyptian Med. Assn.*, 13:207-211, 1930.

Anderson, J. A Study of Dysentery in the Field with Special Reference to the Cytology of Bacillary Dysentery and its Bearing on Early Accurate Diagnosis. *Lancet*, 11:998-1002, 1921.

Andrews, J. Coprozoic Protozoa. *Problems and Methods of Research in Protozoology*. Hegner and Andrews, Macmillan, Chap. VII:59-65, 1930.

The Diagnosis of Intestinal Protozoa from Purged and Normally-passed Stools. *J. Parasitol.*, 20:253-254, 1934.

Brown, P. W. The Nature, Incidence and Treatment of Endamebiasis. *J.A.M.A.*, 86:457-462, 1926.

Callender, G. R. The Differential Pathology of Dysentery. *Am. J. Trop. Med.*, 14:207-220, 1934.

Craig, C. F. Observations upon the Hemolytic, Cytologic, and Complement-binding Properties of Extracts of *Endamoeba histolytica*. *Am. J. Trop. Med.*, 7, 225-240, 1927.

Craig, C. F. Complement Fixation in the Diagnosis of Infections with *Endamoeba histolytica*. *Am. J. Trop. Med.*, 8, 29-37, 1928a.

Craig, C. F. Complement Fixation in the Diagnosis of Infections with *Endamoeba histolytica*. *Proc. Nat. Acad. Sci.*, 14:520, 1928b.

Craig, C. F. The Technique and Results of a Complement Fixation Test for the Diagnosis of Infections with *Endamoeba histolytica*. *Am. J. Trop. Med.*, 9:277-296, 1929.

Craig, C. F. The Cultivation of *Endamoeba histolytica*. Chap. 20 in Hegner and Andrew's *Problems and Methods of Research in Protozoology*. Macmillan, 532 pp., 1930a.

Craig, C. F. The Diagnostic Value of the Complement Fixation Test in Amebic Infections. *J.A.M.A.*, 95, 10-13, 1930b.

Craig, C. F. Further Observations upon the Complement Fixation Test in the Diagnosis of Amebiasis. An Analysis of the Results of the Test in One Thousand Individuals. *J. Lab. & Clin. Med.*, 18:873-881, 1933.

Craig, C. F., and St. John, J. H. The Value of Cultural Methods in Surveys for Parasitic Amebae of Man. *Am. J. Trop. Med.*, 7:39-48, 1927.

Creswell, S. M., and Wallace, B. S. Amebiasis. Survey of 1,002 Stool Examinations. *Northwest Med.*, 33:165-168, 1934.

de Rivas, D. Efficient and Rapid Method of Concentration for Detection of Ova and Cysts of Intestinal Parasites. *Am. J. Trop. Med.*, 8:63-72, 1928.

Fradkin, W. Z. A Sigmoid Aspirator. *J.A.M.A.*, 102:1381-1382, 1934.

Haughwout, F. G. Observations on the Interpretation of the Microscopic Picture in Dysentery and other Intestinal Disorders. *Transactions of the Fifth Congress of the Far Eastern Association of Tropical Med.*, 1924a, pp. 482-514.

Haughwout, F. G. Some Departures from the Typical Cell Pictures of Bacillary and Amoebic Dysentery with Speculations as to their Significance. I. Observations on some Post-Bacillary Exudates and on the Presence of Eosinophiles in Intestinal Allergy. *Philippine J. Sci.*, 25:513, 1924b.

Haughwout, F. G. The Practical Microscopic Diagnosis of Dysentery. *Bull. No. 3, Inst. Med. Res. Kuala Lumpur, F. M. S.*, 1924c.

Haughwout, F. G. *Problems Affecting the Differential Diagnosis of the Dysenteries*. *Problems*

and *Methods of Research in Protozoology*. Hegner and Andrews, Macmillan, Chap. XXIII, 201-221, 1930.

Haughwout, F. G., and Callender, G. R. Dysentery: Its Diagnosis and Management through the Microscope. *Internat. Clin.*, 2:103-140, 1925.

James, W. M. Remarks on the Diagnosis of Intestinal Amebiasis. *Fifteenth Annual Report United Fruit Co., Medical Dept.*, 1926, pp. 82-88.

Kofoed, C. A., and Johnstone, H. G. The Cultivation of *Endamoeba gingivalis* (Gros) from the Human Mouth. *A.J.P.H.*, 19:549-552, 1929.

Kofoed, C. A., Kornhauser, S. E., and Swezy, O. Criteria for Distinguishing the *Endamoeba* of Amebiasis from Other Organisms. *Arch. Int. Med.*, 24, 43:35-50, 1919.

Kofoed, C. A., and McNeil, E. The Advantages of Locke's Blood Medium in the Culture of Parasitic Protozoa of the Digestive Tract. *Am. J. Hyg.*, 15: 315-317, 1932.

Manson-Bahr, P. H. Dysentery: A Review of the Literature of the Last Six Years. *Trop. Dis. Bull.*, 18:313-324, 1921.

Manson-Bahr, P., and Gregg, A. L. The Use of the Sigmoidoscope as an Aid to Diagnosis in Chronic Dysentery. *Tr. Roy. Soc. Trop. Med. & Hyg.*, 14: 88-91, 1921.

McDaniels, H. E. A Simple Stain for Nuclear Structures in Living Amoebae and Cysts. *Science*, 79:187-188, 1934.

Paulson, M., and Andrews, J. M. Detection and

Incidence of Human Intestinal Protozoa by the Sigmoidoscope. *J.A.M.A.*, 88:1876-1879, 1927.

Reed, A. C. Amebiasis, a Clinical Summary. *California & West. Med.*, 40:6-11, 1934.

Reed, A. C., and Johnstone, H. G. Method for Diagnosis of Amebiasis. *J.A.M.A.*, 99:729, 1932.

St. John, J. H. Differential Characteristics of the Amoebae of man in Culture. *Am. J. Trop. Med.*, 6:319-331, 1926.

Thomson, J. G. Pseudoparasites in the Faeces of Man. *Proc. Roy. Soc. Med.* (section of tropical diseases and parasitology), 19:14-18, 1926.

Thomson, J. G., and Robertson, A. *Protozoology. A Manual for Medical Men*. Wood, 1929, 376 pp.

Willmore, J. G., and Shearman, C. H. On the Differential Diagnosis of the Dysenteries: the Diagnostic Value of the Cell Exudate in the Stools of Acute Amoebic and Bacillary Dysentery. *Lancet*, Aug. 17, 1918, pp. 200-206.

Willoughby, H. Intestinal Amoebiasis in Great Britain. *Brit. M. J.*, 1928, pp. 820-821.

Woodcock, H. M. Note on the Relative Proportions of Amoebic and Bacillary Dysentery Among the Troops of the Egyptian Expeditionary Force during the Season of 1917; Together with some Remarks on the Question of Cytodiagnosis. *J. Roy. Army Med. Corps*, 34:121, 1920.

Yorke, W., and Adams, A. R. D. Observations on *Entamoeba histolytica* I. Development of Cysts, Excystation and Development of Excysted Amoebae *in vitro*. *Ann. Trop. Med. & Parasitol.*, 20:279-302, 1926.

ADDENDUM

METHOD FOR STAINING FECAL SMEARS WITH IRON-HEMATOXYLIN

1. Smear is made with a paste brush on a clean flamed slide.

2. Without allowing slide to dry immerse it immediately in the fixing fluid (Schaudinn's).

3. For fixation and staining the following methods should be used:

Minutes

Schaudinn's fluid heated at 60°... 10

or overnight at room temperature.

70% alcohol tinged to a wine color with a saturated solution of iodine in absolute alcohol or with Lugol's solution 10

70% alcohol 5

50% alcohol 5

35% alcohol 5

Tap water (running) 2

Distilled water—rinse

2% iron alum—aqueous solution heated to 30° 10

Tap water (running) 10

Distilled water—rinse

0.5% hematoxylin—aqueous solution heated to 30° 10

Tap water (running) 5

Distilled water—rinse

Minutes

Differentiate in 2% iron alum heated to 30°

Tap water (running) 20.

35% alcohol 5

50% alcohol 5

70% alcohol 5

95% alcohol 5

100% alcohol 5

Carbol-xytol 5

Xylol 5

Mount with a thin layer of balsam thinned with xylol for temporary slides or with thicker balsam and cover slip for permanent slides.

Schaudinn's fluid—Two parts of saturated aqueous Hg Cl₂ in normal salt, 1 part 95% alcohol. This is the stock solution and will keep indefinitely. Add 4 c.c. of glacial acetic acid to 96 c.c. of the stock solution on using. This solution should be made up fresh at frequent intervals.

Hematoxylin stain—Hematoxylin must be properly ripened in order to secure satisfactory results. The best method is to prepare a stock solution of 10% hematoxylin in 100% alcohol. This solution should be corked and allowed to stand in the light for 3 months or

more. The stain—a 0.5% solution of hematoxylin in distilled water—is then made by using 1 part of stock solution to 19 parts of water.

Iron-alum—The ferric ammonium sulphate crystals must be clear and purple or lavender. Yellow crystals should not be used. Make a 2% solution in distilled water.

Carbol xylol may be used in the place of absolute alcohol if the absolute becomes con-

taminated with water; or in handling large numbers of slides it may be used between absolute and pure xylol. (Two washings of toluol may be substituted for the carbo-xylol and xylol.)

Carbol-xylol—Fill wide-mouthed bottle one-third full with clear white crystals of carbolic acid and then fill rest of bottle with xylol. If crystals are yellow or brownish in color the preparation will be discolored.

DISCUSSION OF AMEBIC DYSENTERY PAPERS

F. W. O'CONNOR, M.R.C.S.

Department of Medicine, Presbyterian Hospital, Columbia University, New York, N. Y.

THE frequency of family incidence of amebiasis has engaged the attention of many workers for years. Much may be learned from these "amebic families," as may be illustrated by the study of one such family in Chicago which consisted of 10 members. One daughter had dysentery; the father and another daughter gave a history of recent diarrhea with the occasional passage of blood and mucus. One of the younger sons was found to be losing weight although he complained of no other symptom. On stool examination every member of this family was found to harbor *E. histolytica* cysts and the same sized strain of cyst—about 10 micra—was found in each case. Since we have encountered many amebic families we make it a point invariably to question patients with dysentery regarding the health of the other members, and when suggestive histories are forthcoming, we generally endeavor to examine the other members of the same family. Our object is to prevent the dissemination of infection by these potentially dangerous families. In another respect study of families is desirable when possible, namely, in cases of a patient's relapse after treatment. Since the treatment of amebiasis still leaves much to be desired relapses after any known form of treatment occur in a small percentage of cases. Sometimes

however, there is evidence that the apparent failure to cure is more probably due to reinfection from some other member of the family.

It would appear that at last amebiasis is recognized to be a public health menace in this country. Such being the case it is necessary that in at least the laboratories of state health departments recognition of the causative parasite should be possible. Much has been both written and said to leave the impression that the parasite can only be recognized by a few protozoal experts in certain laboratories of this country. While it is true that long and careful training is necessary before a student becomes a competent protozoölogist or helminthologist with a knowledge of the bionomics, methods of transmission, immunity reactions, etc., of parasites, nevertheless the recognition of the various intestinal protozoa and the ova of helminths may be acquired by any competent technician, at any laboratory where there is abundant fresh material, under one of the recognized teachers.

Several laboratories are engaged in teaching such technicians and find that the average laboratory worker can, within 3 weeks to a month, acquire sufficient knowledge in this field to enable him to render valuable service in diagnosis on return to his unit.

Potential Problems of Industrial Hygiene in a Typical Industrial Area*

J. J. BLOOMFIELD, F.A.P.H.A., AND W. SCOTT JOHNSON, F.A.P.H.A.

*U. S. Public Health Service, Washington, D. C.; and Sanitary Engineer,
Health Division, St. Louis, Mo.*

REALIZING that the improvement of the general health status of the industrial worker is a public health problem and as such should be one of the functions of a department of public health, the health officials of one of the industrial areas in the United States decided to inaugurate a program of industrial hygiene. These officials also realized that one of the first steps in such a program is to obtain a comprehensive conception of the extent of the problem as it exists today. Such a conception, in the absence of definite industrial morbidity and mortality statistics, may be approximated by a preliminary survey of the industrial establishments of the locality, which should be of a type which would reveal the number of persons employed in the various occupations; the materials, processes and conditions associated with these occupations; and the welfare facilities afforded the workers in the industrial environment; thereby yielding a definite picture of the working conditions.

Fortunately, an opportunity to conduct such an investigation in a comparatively brief period was offered through the agency of the Civil Works Act, whereby it was possible to employ

some 40 engineers for this problem. In order to conduct this survey in a standardized manner and under the guidance of experienced personnel, the aid of the Office of Industrial Hygiene and Sanitation of the U. S. Public Health Service was enlisted.

This report deals with the results of this study, and also contains definite recommendations for a program of industrial hygiene for the health department in the area surveyed. It was not possible to evaluate by exact quantitative methods the extent of exposure of workers to various materials and the effect of such exposure on the health of the workers, since this would have required a number of persons trained in industrial hygiene. For this reason, it must be kept in mind, that *the results presented in this report must not be interpreted as indicating in any manner whatsoever that an exposure to an industrial condition or material necessarily implies injury to a workman, but merely indicates the potentialities of the situation.*

METHODS USED IN STUDY

Prior to undertaking the survey, the prospective investigators were given lectures on industrial hygiene in general, and particularly on the technic involved in conducting preliminary surveys. With the aid of 2 simple survey forms investigations were made in 615 plants.

* Read before the Public Health Engineering Section of the American Public Health Association held at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

The shorter of the 2 forms dealt with data pertaining to the plant as a whole, and required such information as the kinds of products manufactured, number and types of buildings, and a "yes" or "no" answer to certain questions relating to industrial welfare provisions, and whether or not disability statistics were kept at each plant. The longer form, dealing specifically with each individual workroom, was designed for recording the type of work performed in the room, the lack or presence of certain kinds of sanitary facilities, the presence of potential exposure to accidents, fumes, and gases, other poisons, dusty processes, and the various occupations and activities of each occupation. These forms were so worded that the investigator had to use his own judgment very little, most of the data being supplied by the plant management, since it was realized that even with the short instruction course given the men, they were still inexperienced in industrial hygiene methods. In view of the uniform manner in which the data were collected, it is felt that the information, as far as it goes, represents the actual state of affairs existing in the various plants at the time this survey was conducted.

The work of each investigator was checked daily and the results were immediately coded on forms prepared for this purpose. At the end of the field study, which consumed about 7 weeks, the coded results were tabulated in the field for statistical analysis.

RESULTS OF SURVEY

Table I shows the number of male and female workers employed in the various plants at the time this study was made. For the sake of simplicity, the different plants are grouped into 10 main industries. Of 28,686 workers covered in this survey, 22,610 (78.8 per cent) were males. The survey covered roughly about one-third of the

persons working in all the manufacturing and mechanical industries in the area, giving an adequate sample of the industrial population under consideration. The industries are arranged in the order of the number of plants found in each industrial group, which in all but one case (the leather industry) also meant in the order of the number of persons employed. By far the greatest number of plants and persons were found in the metal products industry, which accounted for 41 per cent of the plants and 48.7 per cent of the workers.

The percentage distribution of the plants according to the number of employees shows that nearly half (48.7 per cent) of the plants employed less than 10 workers, while 10.2 per cent had 100 or more. The leather products industry, mostly shoe factories, contained the greatest number of plants with 100 or more workers (34.8 per cent). In a few instances, the number of employees totalled close to 1,000; such large plants were frequently found in the metal products industry. At first thought, one would be inclined to conclude that this study included too many small plants, that is, those employing but few workers. However, an examination of the data obtained by the U. S. Census of Manufacturers,* shows that the so-called "small plant" predominates in our manufacturing industries. The percentage distribution for 210,959 manufacturing plants included in the 1929 Census shows an even larger percentage of plants with less than 10 workers than found in the present survey; in the United States, 55.0 per cent as contrasted with 48.7 per cent in the area surveyed. On the whole, the distribution for the plants studied compares very favorably with the manufacturing plants in the United States, indicating that the establishments surveyed were quite representative from the standpoint of numerical size.

* Personal communication.

TABLE I

NUMBER OF PLANTS AND WORKERS IN MANUFACTURING AND MECHANICAL INDUSTRIES SURVEYED

Industry	Number of Plants	Number of Workers		
		Total	Male	Female
Metal products industries.....	252	13,955	12,805	1,150
Printing and allied industries.....	108	2,308	1,884	424
Chemical industry	99	1,793	1,483	310
Clay, glass and stone.....	53	1,372	1,370	2
Leather industry	46	8,031	4,469	3,562
Dyeing and cleaning.....	29	925	310	615
Electroplating	18	89	88	1
Storage battery	5	16	16	0
Rubber goods	3	54	44	10
Fur preparation	2	143	141	2
Totals	615	28,686	22,610	6,076

INDUSTRIAL WELFARE PROVISIONS

Many public health workers and industrialists will concede that a program for the prevention of accidents and disease among the industrial population is a most rational plan. In fact, it is now well understood that the fostering of such programs for minimizing the hazards incidental to employment, is in reality a far-seeing economy. Such programs rightfully come under the heading of industrial welfare, an activity which contributes both to the social and industrial progress of any community. In view of the far-reaching and favorable influence which such activities have been known to exert in the industrial picture, it was deemed necessary to obtain some information on the extent of the industrial welfare provisions in the plants under consideration.

The information on such provisions as safety supervision, medical and nursing facilities, sick benefit associations and disability statistics, disclosed some very interesting facts. Only 5 per cent of the plants and about 20 per cent of the workers were provided with the services of either a part- or full-time safety director and most of these supervisors were found in the plants with 100 or more employees. The medical and nursing care was found to have about

the same status as the safety work. Seventeen per cent of the workers had a part-time medical supervisor and only 15.3 per cent had the services of a full-time physician. Full-time nursing service was found to be present for 34.1 per cent of the employees, with practically no part-time nursing service. The only type of disability statistics existing to a great degree in the plants under study, was that of accident records, the keeping of which is compulsory by the provisions of the State Compensation Act. Sickness records were kept for 40 per cent of the population studied, most of such records existing in establishments having sick benefit associations.

In an attempt to determine the influence of the small plant on the data relative to the industrial welfare provisions, Table II was constructed. This table shows the percentage of plants and employees having certain welfare facilities, in establishments employing 100 or more workers as contrasted with similar data for plants with less than 100. (It was found that 89.8 per cent of the plants had less than 100 workers.)

It is apparent that for practically all the listed industrial welfare facilities discussed, the larger plants had a greater percentage of workers furnished

TABLE II

INDUSTRIAL WELFARE SERVICE IN PLANTS WITH 100 OR MORE EMPLOYEES AS COMPARED WITH PLANTS HAVING LESS THAN 100 PERSONS

Kind of Service	Per Cent of Plants and Employees with Listed Service			
	Per Cent of Plants		Per Cent of Employees	
	100 or More	Less than 100	100 or More	Less than 100
Safety Organizations:				
Safety Director:				
Part-time	25.4	2.7	28.1	6.4
Full-time	29.9	2.2	32.4	6.0
Shop Committees	44.5	6.5	42.2	16.0
Other	73.0	81.6	66.4	86.4
Medical Provisions:				
First Aid Room	53.8	4.9	66.0	12.6
Plant Physician:				
Part-time	19.0	1.4	23.1	5.4
Full-time	11.1	0.2	22.7	0.1
Plant Nurse:				
Part-time	3.2	0.4	5.3	2.0
Full-time	31.7	0.2	50.5	0.3
Disability Statistics:				
Sick Benefit Association	38.1	3.4	39.4	8.9
Sickness Records	49.2	13.3	49.4	20.7
Accident Records	100.0	78.6	100.0	93.9

with such provisions; however, even some of these larger plants were somewhat lacking in medical and nursing service, safety directors, and disability records. It is superfluous to comment at length on the data in Table II, since the information speaks for itself. However, it is desired to point out that in this area, as well as in the United States as a whole, about half of the plants employ less than 10 persons, and 90 per cent less than 100 workers. It is the so-called small plant, therefore, that is predominant, and as this survey has revealed, it is this size plant which was lacking in those welfare provisions which play a vital rôle in any constructive program of industrial hygiene. For this reason, and others that will be developed later, a program of industrial hygiene carried on by a department of health—one that will reach the small as well as the large plant—will be a means of furnishing the services now needed in industrial establishments.

SANITARY PROVISIONS

Although insanitary conditions may not necessarily be associated with ill health, it has long been recognized that the elimination of sources of uncleanness in factories is conducive to the general well-being and efficiency of the workers. For this reason, an attempt has been made to appraise the sanitary facilities of the industries studied by recording the various provisions of a sanitary nature.

In spite of the voluminous writings disseminated on the dangers of spreading disease by the use of the common drinking cup and the common towel, 19.5 per cent of the workers were using the common drinking cup and 13.0 per cent the common towel. In the printing, electroplating, clay, glass and stone, and dyeing and cleaning establishments, about half of the workers were using a common cup, and in some of these same industries the common towel was also tolerated.

POTENTIAL ACCIDENT HAZARDS

An analysis of the data on accident hazards showed that unguarded moving machinery was the most common potential source of injury, 41 per cent of the workers being exposed to this type of risk. Floor hazards ranked next, with 13.2 per cent exposures, while 7.5 per cent of the workers were not protected against the possibility of eye injuries from flying particles.

Our investigation did not allow for an analysis of accidents experienced in the various industries, so that it is not possible to draw any definite conclusions from the data, except to point out that additional precautions should be taken by the officials to eliminate some of the potential sources of accidents disclosed. That such exposures may at times lead to actual injuries is illustrated by the data in Table III, which shows the percentage distribution of compensated cases by specific causes in certain industries in the State of New York for 1931,² as compared with corresponding percentages based on potential accident hazards revealed in the present survey. Only industries and causes common in both surveys were compared, so that it was necessary to omit some material from both studies. It is obvious that a striking relationship exists between the percentage distribution of potential accident hazards and com-

pensated cases for nearly all the causes shown in Table III.

In concluding this portion of the study, one additional table is presented on the possible benefits which may be derived from a closer supervision of safety work. Table IV shows the number and percentage of workers exposed to unguarded moving machinery in plants having either a part-time or full-time safety director, and compares these data with the findings for plants not having such safety supervision. It is apparent that in 4 of the largest industries under consideration (embracing 88 per cent of the total population studied), the percentage of workers exposed to this type of potential hazard was in practically every instance much higher in the plants not having a safety director than in those plants provided with one.

OCCUPATIONAL EXPOSURE TO SPECIFIED MATERIALS AND CONDITIONS

It is well known that numerous materials and conditions incidental to industrial processes are causative factors in the production of occupational diseases. Dublin and Vane,³ list some 94 groups of industrial poisons in the United States, associated with about 900 different occupations. In view of the influence these materials and conditions may have on the health workers, one

TABLE III

PERCENTAGE DISTRIBUTION OF COMPENSATED CASES BY SPECIFIC CAUSES IN CERTAIN INDUSTRIES IN THE STATE OF NEW YORK FOR 1931, AS COMPARED WITH CORRESPONDING PERCENTAGES BASED ON POTENTIAL ACCIDENT HAZARDS DISCLOSED IN PRESENT SURVEY OF SIMILAR INDUSTRIES

Industry	Unguarded Machinery		Floor Hazards		Falls to Different Level		Electric Shock, Burns, Explosions		Corrosive Burns	
	Compens.	Potential	Compens.	Potential	Compens.	Potential	Compens.	Potential	Compens.	Potential
Totals	47.7	57.1	24.6	17.5	10.1	3.4	10.4	15.9	7.2	6.1
Metal products	50.7	55.6	22.2	19.2	9.0	1.4	12.8	18.7	5.3	5.1
Printing	55.2	60.2	27.1	10.9	10.0	1.4	4.4	17.2	3.3	10.3
Chemical products . . .	19.6	41.8	24.7	20.3	18.6	4.6	15.5	12.6	21.6	20.7
Clay, glass, etc.	36.9	35.5	35.4	18.1	13.3	1.7	6.7	39.8	7.7	4.9
Leather products . . .	49.4	69.9	27.5	15.6	8.6	10.2	5.0	3.1	9.5	1.2

TABLE IV

NUMBER AND PERCENTAGE OF WORKERS EXPOSED TO UNGUARDED MACHINERY IN PLANTS HAVING SAFETY DIRECTORS AS COMPARED WITH PLANTS NOT SO PROVIDED *

Industry	Number of Workers		Per Cent Exposed	
	With Safety Director	Without Safety Director	With Safety Director	Without Safety Director
Totals	12,701	12,450	29.0	52.7
Metal products	6,744	7,211	36.3	54.2
Chemical products	670	1,123	30.9	39.0
Clay, glass and stone	537	835	26.4	23.9
Leather products	4,750	3,281	18.7	61.5

* Plants having part-time or full-time safety director are compared with those not having such personnel.

of the most important tasks undertaken in the present inquiry was the recording of raw materials, processes and finished products associated with each occupation encountered in the 615 plants under consideration. Some 50 varieties of materials and conditions were encountered, of which 11 may be placed in the category of a minor exposure, since experience has shown that no cases of systemic poisoning have ever been associated with the handling of these 11 materials. It should be pointed out again, that the *data on occupational exposure to these materials and con-*

ditions, must not be interpreted as signifying that the workers were being subjected to toxic amounts of hazardous materials, for no quantitative studies of the workroom environments were made. The data merely indicate the potentialities present in the plants studied.

Space does not permit a detailed discussion of the results of the occupational exposure to materials and conditions disclosed in this survey. However, an idea of the extent of the problem is afforded by the results shown in Table V, which gives the number and percentage of exposures (not workers,

TABLE V

NUMBER AND PERCENTAGE OF EXPOSURES TO SOME OF THE IMPORTANT MATERIALS DISCLOSED IN SURVEY

Materials	Number of Exposures	Per Cent of Exposures
Inorganic Non-metallic Dusts:	7,862	27.4
Emery Dust	3,678	12.8
Quartz Dusts	2,585	9.0
Carborundum Dust	793	2.8
Other Silicates	403	1.4
Talc Dust	204	0.7
Asbestos Dust	199	0.7
Carbon monoxide	5,538	19.3
Lead compounds	2,926	10.2
Benzol	1,544	5.4
Turpentine	1,124	3.9
Benzine	995	3.5
Methanol	881	3.1
Aniline compounds	863	3.0
Cyanides	561	2.0
Ammonia	477	1.7

since a worker was exposed at times to more than one material) to some of the important materials found. Inorganic, non-metallic dusts, of which there were 6 varieties, had the largest number of exposures, 7,862 (27.4 per cent). Carbon monoxide came next, with 19.3 per cent of the workers exposed, while lead compounds accounted for 10.2 per cent of the total exposures. The other materials and their corresponding figures are listed in this table. It is evident that from the viewpoint of the kind of materials offering possibilities for future study, inorganic non-metallic dusts of the type listed, carbon monoxide and lead compounds are the ones associated with the greatest percentage of exposures (57 per cent). The problem as to materials and number of exposures is certainly indicated quite clearly in Table V.

In order to form an idea of the entire problem concerning the handling of various materials in the plants covered by this survey, the data in Table VI were prepared in a manner to show the number and per cent of contacts in the 5 major industries, using only those ma-

terials in which the exposures were 10 per cent or more. It is quite clear that in the metal products industry dusts of the types listed in Table V, carbon monoxide, and lead compounds constitute the major potential problems; in the printing industry lead compounds, carbon monoxide, aniline compounds, and benzine are of importance from the standpoint of the population covered; whereas in the chemical plants the list includes dusts, lead compounds, aniline compounds, turpentine, manganese compounds, and benzine. In the clay, glass and stone industry only one substance stands out—dust, while in the leather products industry benzol is apparently the only material of importance from the viewpoint of the number of exposures. It is apparent that dust is still one of the most important materials of industrial hygienic significance, with carbon monoxide, and lead compounds closely following. It is of signal importance to point out that, at least so far as the remainder of the United States is concerned, the largest number of cases of occupational poisoning have been due to these same materials. It

TABLE VI

MATERIALS IN THE FIVE MAJOR INDUSTRIES IN WHICH THERE WERE 10 PER CENT OR MORE EXPOSURES

<i>Industry</i>	<i>Materials</i>	<i>Per Cent of Exposures</i>	<i>Number of Exposures</i>
Metal Products	Inorganic, non-metallic dusts.....	43.6	6,088
	Carbon monoxide	27.5	3,842
	Lead compounds	11.1	1,548
Printing	Lead compounds	37.7	871
	Carbon monoxide	28.6	660
	Aniline compounds	15.5	358
	Benzine	11.5	266
Chemical Products	Inorganic, non-metallic dusts	34.1	612
	Lead compounds	20.9	374
	Aniline compounds	14.4	258
	Turpentine	14.0	251
	Manganese compounds	11.3	202
	Benzine	10.4	187
Clay, Glass and Stone	Inorganic, non-metallic dusts	44.3	608
Leather Products	Benzol	13.1	1,053

is the feeling of the writers of this report that the problem confronting the health officials and industrialists of this area is made manifest by the results of this study.

RECOMMENDATIONS

The preliminary survey of the industrial establishments reported indicates that a large part of the industrial population surveyed is handling materials, and is associated with processes and conditions of manufacture which, if not properly controlled, may lead to injury and ill health of the workers. It is the feeling of public health workers that the improvement of the general health status of the industrial worker is as much of a public health problem as the control of communicable diseases, or any other phase of preventive medicine. As a result of the numerous studies conducted on the health of industrial workers by the U. S. Public Health Service, as well as other agencies, it is established that morbidity and mortality rates are higher for the industrial than the general population, and that certain occupations are of first importance as factors in the causation of excessive sickness and mortality rates.

That the general health of the worker in industry is affected by the materials, processes, and conditions incidental to employment, aside from what we already know of the rôle played by specific occupational diseases, is interestingly presented by Dublin.⁴ In evaluating the effects of the industrial environment on the well-being of a large number of workers in a mortality study among $3\frac{1}{4}$ million white, male wage earners, he found that the mortality rates for the industrial workers were from one and one-half to more than double those for the non-industrial workers. In terms of life expectancy the industrial worker at age 20 had an expectation of life of 42 years as compared to 49 years for the 20 year old non-

industrial workers, or a decrease of 7 years. It is Dublin's feeling that although heredity and innate differences play some part, probably the most important factors are the conditions incidental to industrial employment, such as toxic gases, dusts, specific occupational poisons, extreme temperature variations, and many other industrial hazards.

When one considers the size of the industrial population of the region covered in this study, and the results of this survey on a representative sample of the industrial population, in which the potentialities of occupational hazards are clearly brought out, the possibilities of the situation are quite evident, and certainly merit the attention of the local health department.

We know the effect on the human body of various communicable diseases, such as typhoid, smallpox, diphtheria, etc., and take the necessary measures to control them. The effect on health of certain toxic materials used in industry is also known, and it would seem logical to take appropriate measures for the control of these occupational diseases. We know about some of the toxic materials and processes which may affect health. For example, it is known that exposure to more than 20 million particles of granite dust (35 per cent quartz) per cu. ft. of air will in time cause silicosis of a disabling type, usually followed by tuberculosis⁵; that the breathing of more than 1.5 mg. of lead per 10 cu. m. of air, in the form found in lead storage battery plants, will in time lead to serious types of plumbism.⁶ In short, if these various materials and processes are not controlled, they will affect the health of the individuals exposed to them, and in the case of a disease such as tuberculosis, others in the community may be affected.

It may be said that occupational disease problems should and could be

solved by industry itself. It is the feeling of students of this problem that such a procedure is no more feasible than the attempt of an individual to control communicable diseases in his own home, or industry the pollution of streams. Industrial hygiene is now recognized as a major public health function, affecting directly the health of a large population and indirectly the well-being and economic status of the entire community. The fact that industry will benefit by the control of occupational diseases, should be considered as merely incidental. No industry is large enough to employ the personnel and facilities necessary for industrial hygiene work, and one must not lose sight of the fact that in the present case, as well as in the country in general, the largest percentage of the industrial population is employed in small plants (nearly 50 per cent of the plants studied employed less than 10 persons), and the greatest need is for these small plants which are incapable of dealing with their problems individually. A health department, with its commissioner, epidemiologist, public health nurse, sanitary engineer, bacteriologist, chemist, laboratory technicians, etc., all in one compact unit, is the only practical body equipped to conduct work of a preventive nature in industry.

The practice of industrial hygiene (control of occupational diseases) falls largely within the province of two types of workers, the physician and the engineer. It is within the sphere of the physician to diagnose occupational diseases and primarily to recognize the existence of those diseases due to the factory environment. Based on the findings of the physician, the engineer is in a position to learn where control measures should be initiated. The engineer's work consists of studying the local plant conditions which have been shown to be detrimental to health, and evaluating the various methods which

may be designed for controlling the hazards. It is impossible to tell by a mere inspection of a workroom whether toxic materials are present in the air in such quantities as to constitute a hazard, and whether the protection afforded is adequate. Precise quantitative measurements are needed. Once these measurements have been made, the engineer is able to determine definitely the extent of the hazard and the necessary remedial measures.

In order to carry out a constructive program of industrial hygiene the minimum requirements are:

(A) A physician thoroughly trained in public health procedure and one having a comprehensive knowledge of the effects upon health of the various materials and processes used in industry; in other words, one trained in industrial hygiene.

(B) An engineer who is also trained in industrial hygiene and who is familiar with industrial processes. He should know the following subjects from both a theoretical and practical viewpoint:

1. Microscopy
2. Gas chemistry
3. Mechanics of ventilation
4. Physiology of ventilation
5. Industrial sanitation
6. Illumination
7. Industrial hygiene survey methods

(C) A completely equipped laboratory for carrying on studies in industry. With such personnel and facilities, the following program could be inaugurated:

1. Reporting of all occupational diseases to the division carrying on industrial hygiene work. This will definitely establish where and to what extent certain occupational diseases are occurring, and to suggest corrective measures.

2. In order to acquaint industry, the medical profession, and others interested in such a program, it may be necessary that the personnel carry on an

educational campaign, designed to instruct and interest the various groups involved, as to the importance of the problem, in an effort to further the program. It has been the experience of health departments that the best way to conduct work in industrial hygiene is to coöperate fully with industry, conducting studies in plants, as a rule, only upon request of industry. At the completion of such studies a confidential report on the results should be presented to the plant officials, with recommendations for the improvement of conditions, if such information is necessary and available. All this should be made very clear to the individuals concerned, in order to obtain the coöperation and aid necessary for such work.

3. Studies of the workroom environment and the health of workers by the industrial hygiene personnel as outlined in 2.

4. In order to carry on this work with the minimum amount of friction and in a spirit of coöperation, it may be necessary to provide a law or regulation which specifically states that the results of any investigation made by the health department can in no way be used in litigation, either by the employer or by the employee. The need for such a ruling is obvious if the interests of all concerned are to be served justly. Attention is called to the Act under which the Bureau of Occupational Diseases of the Connecticut State Department of Health functions, as well as to the ex-

cellent work this Bureau is accomplishing in the control of occupational diseases in that state.⁷

The additional cost for maintaining industrial hygiene personnel of the number and type given would not exceed \$10,000 a year, or slightly more than 1 cent per capita in the present case. When one realizes the fact that one case of silicosis often costs more than the \$10,000 needed for a preventive program of the type outlined, the financial phase of the problem should certainly not preclude the establishment of such a vital adjunct of a health department in a large industrial center.

In closing, it is well to emphasize one important point: namely, that occupational diseases are in a large measure preventable, and the degree of prevention exercised by a community will be reflected in the general health status of that community.

REFERENCES

1. *15th Census of the U. S. Census Bureau: Occupations by States*. Vol. 4, 1930.
2. Causes of compensated accidents, two years, 1930 and 1931. *Special Bull. No. 182*, Department of Labor of the State of New York, 1933.
3. Dublin, Louis I., and Vane, Robert J. Occupational hazards and diagnostic signs. *U. S. Bureau of Labor Statistics Bull. No. 582*, 1933.
4. Dublin, Louis I. The mortality trend in the industrial population. *A.J.P.H.*, 19, 5 (May), 1929.
5. Russell, A. E., Britten, R. H., Thompson, L. R., and Bloomfield, J. J. The health workers in dusty trades. II. Exposure to siliceous dust (granite industry). *Pub. Health Bull. No. 187*, 1929.
6. Russell, A. E., Jones, R. R., Bloomfield, J. J., Britten, R. H., and Thompson, L. R. Lead poisoning in a storage battery plant. *Pub. Health Bull. No. 205*, 1933.
7. *Necessity for Bureau of Occupational Diseases, Connecticut*. Connecticut State Department of Health (Hartford), 1933, 22 pp. plus appendices.

The City Health Officer Looks at Diphtheria Prevention*

HUNTINGTON WILLIAMS, M.D., Dr.P.H.

Commissioner of Health, Baltimore, Md.

MORE than a decade has now been spent in many communities in organizing and improving campaign measures aimed toward the ultimate local eradication of diphtheria. Although a health officer may learn much of value in studying the procedures in use in various other parts of the country, each one must eventually work out a machinery of his own, based upon and deeply rooted in local circumstances. By these I mean the community inheritance of relationships between the health department and such groups as the medical profession or other official or nonofficial health agencies, as well as the inheritance in statutory responsibility placed directly upon the local health department itself.

A diphtheria prevention program organized to meet the conditions existing in Baltimore might go on the rocks in a mid-western or western city and *vice versa*. Of course this does not mean that there are not many procedures and methods which will work successfully, wherever applied.

In Baltimore the City Code of Ordinances, in specifying the duties of the Commissioner of Health (there is no Board of Health in our city), includes the statement:

It shall be his duty . . . to make diligent inquiry into all cases of malignant, in-

fectious or contagious diseases which may occur, and cause immediate measures to be taken to arrest their progress. . . .

Similar responsibility is placed upon boards of health in many localities, as for instance in one of our larger cities where the Charter specifies that the Board of Health—

. . . shall, so far as is possible, prevent and suppress the spread of infectious and contagious diseases

and in another city where the Charter provisions require the Board of Health—

. . . to use all reasonable means for ascertaining the existence and cause of diseases of peril to life and health and for averting the same.

To my mind, with such definitely fixed legal responsibility as exists in our city, the health officer and the health department should never abdicate or turn over to any other person or group the mechanics of such a program as diphtheria prevention but, with the least expense on his budget, should organize his antidiphtheria fighting forces with only one thought in view, namely, what methods will most rapidly result in the practical eradication of diphtheria from the community, or in other words, what methods will most rapidly achieve the protection of the greatest number of children at about the age of 6 months.

Quite properly, primary attention is needed in securing as far as is possible, the whole-hearted support of the local medical profession in a civic diphtheria :

* Read at a Special Session on Diphtheria Immunization of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

prevention campaign. As a rule, the medical profession expects or should expect leadership in health promotion from the health department; on the other hand, no health officer should fail to indicate to the medical profession that the health department cannot do its job along modern lines without the active support of the local medical fraternity. The health officer needs this positive support and has the right to expect it and to receive it. None the less, he must also earn it by indicating an appreciation of the problems facing the medical profession and by showing an earnest desire to serve the profession in a firm but friendly way. It is my experience that slight modifications of inherited and sometimes troublesome health department procedures often play a tremendous part in winning the coöperative support of physicians. It was our good fortune, in 1932, to have the following resolution adopted unanimously by the *Baltimore City Medical Society* on the recommendation of its own Committee on Public Health and Relations:

The Committee on Public Health and Relations after a full discussion of the problem, diphtheria immunization, believes that the best interests of the community could and would be better subserved by the *Baltimore City Medical Society* requesting the Health Department to put on a campaign on diphtheria immunization and that the physicians of the city coöperate with the Health Department to that end. Also wherever individuals or families, because of their impaired circumstances, are unable to pay for the service that the Health Department be asked to render the necessary immunization gratis.

Similar resolutions were adopted at the same time by the three other medical societies in the city.

The machinery for community diphtheria prevention, like all other public health work and human relationships in general, requires a pretty ample supply of what I like to refer to as "oil and grease," which must be applied at the

right time and in the right places, if success is to be achieved.

I have noticed that diphtheria prevention efforts may languish for lack of adequate financial support. I do not think a health department can undertake an antidiphtheria campaign in any adequate manner if special funds are not set aside for this particular work. An immunization program merely added to routine health department activities is often unfruitful. We have been fortunate in having during recent years from \$1,000 to \$1,400 a year for our annual diphtheria prevention campaign. This is in addition to a considerable sum spent on toxoid which, of course, should be supplied by the Bureau of Laboratories without cost for use in private medical practice.

It has been helpful to focus the major community attention on diphtheria on May Day, or Child Health Day, although this year the opening of the *fourth annual campaign* has been postponed until October 1, because of the presence of a widespread city measles outbreak during April and May. The campaign does best, however, if it is continued throughout the year, and it has been our custom to begin with the New Year an effort "to skim off the cream" of the diphtheria prevention practice and steer it into the offices of the private practitioners. Our publicity for the first 4 months each year places the main emphasis on securing one dose alum precipitated toxoid inoculation for all children at the age of 6 months, or as soon thereafter as possible, and from the family physician. Public clinics are open throughout the entire year, however, and with the city-wide publicity campaign launched by a proclamation from the Mayor on May 1, the Health Department, with its medical and public health nursing forces, conceive it to be their duty to "mop up," so to speak, in the clinics every possible child that has not been inoculated

by that time. In describing our campaign efforts, including the focus on steering diphtheria prevention work into doctors' offices, before a luncheon club made up largely of lawyers and business men, I was struck not long ago by the comment of a lawyer who said his profession would be fortunate in having some governmental agency doing as much for them.

Of course the newspapers probably are the greatest single help in the publicity, although the radio and a minute-and-a-half talkie trailer shown in the motion picture houses throughout the city are among the other most valuable adjuncts.

This movie talkie trailer, created by our Health Department with the aid of volunteer guild actors was seen during May, 1933, by an estimated audience of about one-half the city population. It is based on a special 6 months personal greeting card, which is sent by the Health Commissioner to about 35 Baltimore babies each day throughout the year, and every year, on the day they reach the age of 6 months. Promptly following its mailing there is a follow-up visit by a public health nurse. The card has on it the picture of a child of about the right age, and the message is one wishing the baby the best of health and happiness and urging particularly that the parents protect the child by toxoid inoculation without delay. The assistance of the Public Health Committee of the City Medical Society was sought in the wording of this important message, which reaches practically all of the 14,000 babies born each year in our city. Among other things the message states

We hope your parents will plan *now* to protect you against diphtheria.

Surely, if you could talk you would ask them to do this for you. Maybe the next time you cry your Mother or Father will understand that you are begging for their help and will take you to a doctor who will give you the safe and harmless toxoid inoculations,

or refer you to one of the Health Department clinics.

The movie talkie trailer, which is entitled "An Ounce of Prevention," depicts the postman leaving the message at Mrs. Kelly's doorstep, addressed to the Kelly baby, who is 6 months old on that day. Two more scenes indicate Mr. and Mrs. Kelly going into a huddle over the matter and Mrs. Kelly then taking the baby to Dr. Brown for toxoid inoculation.

Just this year, in May, we adopted 1 c.c. of alum precipitated toxoid as the standard immunizing agent for our city and we expect that a larger number of children will be protected because only one dose is necessary. In former years with two-dose toxoid about 12 per cent of the children receiving the first dose failed to return for the second one. This change from the two-dose toxoid was made after a local research study and in consultation with the authorities at the U. S. Public Health Service.

With us the entire community focus on diphtheria prevention is set at the age of 6 months "or as soon thereafter as possible." It has always appeared to me that if a health department states merely that the preschool age is the desirable period for inoculation, without saying anything more definite, the average parent will procrastinate until the child is nearly ready to go to school, and much valuable time will thereby be lost. The constant reiteration of 6 months as the desirable age has, I believe, resulted in an earlier average inoculation age in our community than would otherwise have been the case.

The selection of 6 months as the age of choice for toxoid immediately brings into focus the fact that the Schick test, except for occasional sampling of the child population, is of no practical administrative value in a program aimed at the younger preschool children. It is for this reason that I am

constantly amazed at the reluctance with which some administrative health officers approach the decision of throwing the Schick test overboard as a health department procedure. The *Appraisal Form* may in part have been responsible for this. I know that a few of my scientific friends are saddened by this feeling I have, which is quite a strong one, that the health department's job is to expend all its energy on getting more and more 6 months old babies inoculated. With the dramatic reduction in diphtheria in recent years following widespread immunization, the question of exactly what percentage of inoculated children may or may not be Schick positive after varying intervals of time should be a matter of only academic interest to a health department. It may possibly be that 10 years from now we will be sorry that we have not done Schicks on the thousands of children inoculated in Baltimore, but I am extremely doubtful of it and believe that the Schick test is a time consuming and expensive interference in a clear-cut city diphtheria prevention campaign where the age group focused upon is made up of 6 months old children.

By periodic letters to the medical profession twice a year, by the use of business reply cards for reporting children inoculated, which are sent out with these letters and are also distributed with the toxoid from the Bureau of Laboratories, the Health Department has been fortunate in receiving an increasing number of reports of diphtheria prevention work in private practice. In 1932 the ratio of protected children reported by medical practitioners as compared with those inoculated at the clinics was 1 to 16; whereas in 1933 there had been a relative increase in the work done and reported by physicians, so that the ratio then stood as 1 to 6. For the first 7 months of 1934 the ratio has been 1 to 4. Of course the 1934 campaign,

opening in October, will probably alter this last ratio somewhat.

The Parent - Teacher Associations throughout our city have organized diphtheria prevention committees and home visiting groups and have been of the utmost assistance in persuading parents, during the active part of the campaign, to have their children protected. Similar work has been carried on by our well organized Negro civic groups. The school authorities likewise have been most coöperative, and many industrial concerns have placed in their pay envelopes special pink health department slips urging the toxoid inoculation of children in the families of the employed groups in industry. During the 1932 campaign these same slips were also sent out with each telephone bill in the residential areas during the month of May. Many collateral forms of publicity have been helpful, including out-door posters, placards inside and outside of trolley cars, displays in conspicuous downtown store windows, and articles in a score or more of special local periodicals, including the foreign language press. The new poster in use this year was drawn by a high school girl in a city-wide school art class competition.

The message the year around and emphasized particularly during the month of May is shown opposite.

It is difficult to appraise the exact results of an effort of this kind but we have set for ourselves the goal A Year Without a Death from Diphtheria in a city of over 800,000 population. The case and death rates have come tumbling down in recent years with these active diphtheria prevention campaigns. In 1930, 17 per cent of our preschool population had been reported as inoculated; in 1932, the percentage was 24; and in 1933, it was 31 per cent. In 1930 there were 20 diphtheria deaths in our city, which was the lowest figure on record at that time. In 1932,

PARENTS! TOXOID PREVENTS DIPHTHERIA
SEE YOUR PHYSICIAN

OR

VISIT A DIPHTHERIA PREVENTION CLINIC

PROTECT YOUR CHILDREN AT THE AGE OF SIX MONTHS, OR AS SOON
THEREAFTER AS POSSIBLE

there were 15 deaths, and in 1933 there were only 6 deaths; whereas so far this year we have already had 5 deaths. The diphtheria death rate for the year 1933 was 0.7 per 100,000 population.

There may be years when the rates will go up a bit, but if our continuing efforts are adequate there should never be a return to the conditions of the pretoxoid era.

Diphtheria Immunization Record

THE largest number of diphtheria immunizations in any year since 1929, 185,586, was reported by Dr. John L. Rice, Health Commissioner (New York City), for the year 1934. Of the number of children immunized 117,569, or 64 per cent, were under 6 years old. In 1929, when the Diphtheria Prevention Commission began its intensive drive, 211,985 children were immunized. Since this commission ceased to func-

tion in 1931, the work has been carried on by the Health Department without outside funds. In 1932 there were 166,243 immunizations; in 1933 there were 161,611.

Deaths in the 3 year period 1932-1934 fell to an average of 133 per year, contrasted with 750 when the demonstration was begun in 1929.—*Medical News* (New York City), *J.A.M.A.*, Mar. 2, 1935, p. 757.

Diphtheria Immunization by One Injection*

V. K. VOLK, M.D., D.P.H., F.A.P.H.A.

*Deputy Commissioner, Oakland County Department of Health,
Pontiac, Mich.*

A STUDY was made of the time required for development of immunity and the degree and frequency of reactions which follow the use of toxoid.

The various preparations of toxoid administered intramuscularly to a large group of Schick positive children were:

1. New York City toxoid, $8\frac{1}{2}$ units per 1 c.c.
2. New York City toxoid, $8\frac{1}{2}$ units per 1 c.c. to which 0.2 per cent alum was added
3. Michigan toxoid, $7\frac{1}{2}$ units per 1 c.c.
4. Alabama alum precipitated toxoid, 10 units per 1 c.c.
5. Michigan alum precipitated toxoid, 20 units per 1 c.c.
6. New York City alum precipitated toxoid, 42 units per 1 c.c.

Results obtained with two injections were described previously,¹ but are presented briefly for comparison.

In a group of 359 children, two 1 c.c. injections of $8\frac{1}{2}$ units of toxoid produced 93 per cent immunity at the end of 12 months. In a group of 337 children, two 1 c.c. injections of a similar preparation, modified by the addition of 0.2 per cent of alum, produced 95 per cent immunity in the same period, and showed a more rapid development of immunity during the first few months.

In a group of 229 children, two 1 c.c.

injections of concentrated toxoid of 30 units per c.c. produced 86 per cent immunity at the end of 12 months. Reactions following the use of this preparation were 3 times more frequent than from toxoid of lower potency. The results obtained with alum precipitated toxoid were determined by re-Schicking at the end of 6 months those children found to be positive at the end of 6 weeks.

Another group of 173 children were given the Schick test 6 months following administration of one injection of alum precipitated toxoid from 3 laboratories; the percentage of Schick negatives was slightly lower than those obtained at the end of 6 weeks, the figures being: Alabama 66 per cent, Michigan 69 per cent and New York 71 per cent.

Although a somewhat higher percentage of negatives was expected among the group of children previously Schick tested, the lack of correlation was apparent between these groups and invited investigation as to the duration of the immunity.

A group of 170 children who were Schick negative 4 to 6 weeks after receiving one injection of alum precipitated toxoid of either 10 or 20 antigenic units, were tested after 6 to 7 months. Of this group previously Schick negative, 16, or $9\frac{1}{2}$ per cent, had become positive.

* Read at a Special Session on Diphtheria Immunization of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

TABLE I

SUMMARY OF RESULTS OBTAINED WITH ONE INJECTION OF 1 c.c. OF TOXOID

Preparation	Units per 1 c.c.	Number of Children in Group	Per Cent Schick Negative at End of:				
			4 Weeks	6 Weeks	8 Weeks	6 Months	12 Months
New York City Toxoid.....	8½	220	..	..	40	..	57
New York City Toxoid modified with 0.2 per cent alum.....	8½	388	..	..	47	..	61
Michigan Toxoid	7½	217	..	..	42	..	61
Alabama alum precipitated Toxoid	10	290	64	73	..	84	..
Michigan alum precipitated Tox- oid	20	239	62	72	..	83	..
New York City alum precipitated Toxoid	42	193	65	73	..	86	..

McGinnes and his coworkers² found the reversion of Schick negatives to Schick positives took place in 5.6 per cent of 342 children. Another group of 71 children who were Schick negative 4 to 6 weeks after receiving one injection of alum precipitated toxoid of 42 antigenic units showed reversion of 3 per cent to Schick positive when retested after 6 to 7 months. The age group of children showing reversion of the Schick test runs parallel with the age distribution of the entire group.

Ten of the 18 children who showed reversion of the Schick test were retested 6 weeks later, and at the same time blood was taken from 7 for the purpose of ascertaining the antitoxin concentration.* The results of these tests are shown in Table II.

It may be seen that 7 children showed an increase in their immunity status by the stimulus of the preceding Schick test injection and that 3 out of 7 had antitoxin above the so-called immunity level of 0.03.³

REACTIONS

The frequency and degree of reactions have been partially reported.¹ A detailed questionnaire was sent to the parents of all children who received one

of the toxoid preparations. Over 66 per cent of the questionnaires were returned and it is reasonable to assume that there were no moderate or severe reactions among those who failed to reply.

While we are aware that the parents' interpretations of reactions might not coincide with the clinical picture, we consider them of importance because they reflect the parents' observations.

Table III, which represents an analysis of over 1,100 replies, shows the per cent of reactions in the entire group of children regardless of age.

When analyzed by age group, reactions are found to be much less frequent in the age group under 8, reactions increasing in frequency as age increases.

Attention is called to the occasional occurrence of general reactions immediately following the administration of the Schick test in children who had previously received the Schick test and toxoid. These reactions previously described,¹ while of short duration, were of sufficient severity to justify alarm over the character of the attack, which resembled anaphylaxis.

Another case of severe reaction was observed on November 27, 1934. A boy, age 5, had a preliminary Schick test with controls on April 6, 1934, which was read on April 11. At that time he received 1 c.c. of alum pre-

* Antitoxin concentration was determined through the assistance of Dr. W. E. Bunney of the Michigan Department of Health.

TABLE II

SHOWING REVERSION OF SCHICK TEST IN A GROUP OF CHILDREN AND RELATIONSHIP TO ANTITOXIN CONCENTRATION

Case No.	1	2	3	4	5	6	7	8	9	10
Child's Age	8	8	11	7	6	5	6	4	6	7
Preliminary Schick test April, 1934	xxx	xxv	xx	xx	xx	xxx	xx	xxxx	xx	xxx
<i>Alum Precipitated Toxoid, 4-16-34</i>										
Schick test May, 1934	—	—	—	—	—	—	—	—	—	—
Schick test Oct., 1934	x	xx	x	x	xxx	x	x	x	x	x
Schick test Nov., 1934	x—	—	xx	—	—	x	xx	—	—	—
Antitoxin units per 1 c.c. Nov., 1934	<0.002	>0.1	<0.002	0.05	0.05	0.01	>0.01 <0.05	Not obtained		

cipitated toxoid. When retested on May 28, the child was Schick negative. On November 27, together with many other children he was again retested to study the frequency of reversion of Schick tests. In less than 15 minutes after the test, while the author was on his way to another school, the nurse noticed that the child had developed urticaria and redness over his entire body, swelling of the face and severe

pain in the epigastric region. In this case there was no shortness of breath and though he was generally distressed, he did not require the administration of adrenalin. A similar case of severe reaction has been reported by Shiffrin.⁴

Though these reactions are fortunately rare, they tend to serve as a restraining influence in the acceptance of toxoid as the preparation of choice. Undoubtedly the repetition of the Schick

TABLE III

PER CENT OF REACTIONS FOLLOWING 1 C.C. INJECTIONS

Preparation	Units per 1 c.c.	Per Cent Having No Reaction	Local			General		
			Per Cent Mild	Per Cent Moderate	Per Cent Severe	Per Cent Mild	Per Cent Moderate	Per Cent Severe
New York City Toxoid..	8½	26	65	8	..	20	3	1
New York City Toxoid modified with 0.2 per cent alum	8½	28	67	7	..	28	6	1
Michigan Toxoid	7½	33	63	3	..	12	8	1
Alabama alum precipitated Toxoid	10	24	70	6	..	24	4	..
Michigan alum precipitated Toxoid	20	27	69	4	..	22	3	..
New York City alum precipitated Toxoid... 42		12	86	2	..	38	1	..

test was a contributing factor, but elimination of the test could scarcely be offered as a solution of the problem. Bunney's⁵ opinion on the subject is of interest:

The results suggest a very definite need for a study of the Schick test following immunization with alum precipitated toxoid. If an injection of toxoid in contrast to a toxin-anti-toxin injection, renders a certain number of children sensitive so that an injection of diphtheria toxin in the Schick test causes shock, and perhaps in some individuals a false straight positive reaction; then it might very well be possible that an injection of alum precipitated toxoid, in which the toxoid is being absorbed from the site of injection over a considerable period of time, would result in a larger number of such sensitized children.

CONCLUSIONS

1. Analysis of the results obtained clearly indicate the superiority of alum precipitated toxoid as an immunizing agent.

2. Preparations of higher potency make only a moderate difference in the percentage of children developing a negative Schick reaction.

3. Local and general reactions are

more frequent in the preparations of higher potency.

4. Immediate reactions which follow the administration of the Schick test in previously immunized children deserve most careful study.

5. The duration of immunity effected by alum precipitated toxoid needs careful investigation. It is possible that preparations of higher potency may confer more lasting immunity.

6. The creation by the American Public Health Association of a committee to evaluate the results of the studies made by a large group of workers in the field of diphtheria prevention will be a helpful factor in acquiring more facts and better knowledge of what may be expected from the use of alum precipitated toxoid.

REFERENCES

1. Monroe, J. D., Volk, V. K., and Park, W. H., *A.J.P.H.*, 342-348 (Apr.), 1934.
2. McGinnes, G. F., Stebbins, E. L., and Hart, C. D., *A.J.P.H.*, 1141-1147 (Nov.), 1934.
3. Young, C. C., Bunney, W. E., Crooks, M., Cummings, G. D., and Forsbeck, F. C. *A.J.P.H.*, 835-849 (Aug), 1934.
4. Shiffrin, P. Not yet published.
5. Bunney, W. E. Personal communication.

Potability of Water from the Standpoint of Fluorine Content *

H. V. SMITH

University of Arizona, Tucson, Ariz.

MOTTLED enamel was first described in the United States by Black and McKay¹ although it had been described in 1901 by Eager,² who found it in Italian immigrants. Their findings seemed to point to local water supplies as responsible. It was not, however, until 1931 that it was found to be due to fluorine in the water. The proof³ consisted of giving water which was known to cause human mottled enamel to rats, and also feeding to other rats small amounts of sodium fluoride. In both cases mottled enamel was produced. Added proof in the way of chemical analysis showed low concentrations of fluorine in waters not associated with enamel and high concentrations in waters which had produced the defect. Churchill⁴ added further evidence by analyzing waters from several parts of the United States. High fluorine contents were found in certain endemic regions.

METHODS OF FLUORINE ANALYSIS

Since our proof of the causal relationship of fluorine to mottled enamel, the question of potability of water from the standpoint of its fluorine content has become of prime importance. Lack of accurate methods of fluorine analysis

has impeded progress in determining the toxic level.

At the time the original investigation was made in 1930 the most promising method available was that of Ross, Reynolds, and Jacob,⁵ in which dry silicon tetrafluoride was distilled into water and the resulting hydrofluosilicic acid determined by titration with a standard base. Using this method in a limited number of analyses, it appeared that waters containing 2 p.p.m. or more of fluorine were associated with mottled enamel as its cause. A year later an extensive investigation⁶ was carried out in Arizona for the twofold purpose of disclosing endemic areas in the state and obtaining evidence from analyses of water supplies from both endemic and non-endemic areas by which it would be possible to determine definitely the concentrations of fluorides in drinking water which interfere with normal enamel development.

Since the volatilization method did not lend itself well to routine determinations, another method of analysis was sought, and the Fairchild method was selected. In this method ferric iron in excess is added to the fluorine containing water. The iron combines with the fluorine, probably forming a complex ion. The uncombined iron is then determined iodimetrically and the amount of fluorine present calculated.

The survey disclosed about 45 towns or rural districts in Arizona in which

* Read at a Joint Session of the Laboratory and Public Health Engineering Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

mottled enamel is endemic. Analyses of 110 public and 75 private water supplies show a fluoride content ranging from 0.0 to 12.6 p.p.m. Concentrations above 2.7 p.p.m. were found to be definitely toxic, that is, always associated with mottled enamel in its consumers.

Because of the great interest in this problem, several more sensitive methods for fluorine determination have been developed recently, and the Fairchild method has been shown to give results which are far too high.

The methods of Foster⁸ and of Armstrong⁹ both depend upon the removal of fluorine by the addition of an excess of ferric chloride as in the Fairchild method. The uncombined iron is determined colorimetrically, Foster using ammonium sulphocyanate and Armstrong acetylacetone.

Foster has also found that sulphates, chlorides, and other ions act similarly to fluorine and withdraw a certain amount of iron from solution. The effect of these ions is therefore nullified by adding slight additional amounts of ferric chloride.

The Steiger method,¹⁰ one of the older methods for fluorine, has been modified by both Wichmann¹¹ and Boissevain.¹² In this a peroxidized titanium chloride solution is bleached by fluorine, the amount of fading being proportional to the amount of fluorine present. It is somewhat difficult to detect differences in the fading produced by samples varying by 0.1 p.p.m. fluorine in ordinary Nessler tubes. Undoubtedly the photo-electric colorimeter of Wilcox¹³ used to compare the ferric acetylacetone colors of Armstrong's method would be more sensitive than comparisons in Nessler tubes. Sulphates in excess are known to interfere with this method, and correction is made if the concentration is too high.

Willard and Winters,¹⁴ Thompson and Taylor,¹⁵ and Sanchis¹⁶ use

alizarine red-zirconium nitrate as an indicator in their determination of fluorine.

The Willard and Winters method depends upon removing interfering elements by a preliminary distillation. The fluorine in the distillate is titrated with thorium nitrate, using the above mentioned indicator.

The Sanchis method has been modified from the Thompson and Taylor method for fluorine in sea water and is adaptable to the analysis of fresh waters. Chloride and sulphate effects up to 500 p.p.m. are nullified by the addition of hydrochloric and sulphuric acids.

COMPARISON OF ANALYTICAL RESULTS

Analyses of many waters for fluorine using the Fairchild, Foster, Willard and Winters, and Sanchis methods have been made by the writer and the results compared. These data are presented in Table I. Further evidence is here given that the results of the analysis of waters by the Fairchild method are abnormally high.

On the other hand, results by the Foster, Willard, and Sanchis methods compare very closely with each other, the results obtained by any one of these 3 methods being practically the same.

The results of the analysis of 54 waters by these 4 methods are grouped into 2 classes: (1) waters which are known to be associated with mottled enamel, and (2) those which have been found not to cause mottled enamel. This division is based on tooth examinations made by M. C. Smith.

It may be seen by inspection of Table I that the 33 waters associated with mottled enamel, as analyzed by the Foster, Willard, and Sanchis methods, have a fluorine content varying from 0.7 p.p.m. to 13.2 p.p.m. Twenty-one waters which did not cause mottled enamel had fluorine contents ranging from 0.1 to 0.8 p.p.m.

TABLE I

WATERS ASSOCIATED WITH MOTTLED ENAMEL

Lab. No.	Location	Method			
		Fairchild <i>p.p.m.</i>	Foster <i>p.p.m.</i>	Willard <i>p.p.m.</i>	Sanchis <i>p.p.m.</i>
20487	Ajo	5.8	2.2	...	...
20670	Aztec	12.0	7.2	6.8	8.0
20853	Buckeye	2.4	1.5	1.2	1.3
20106	Cochise	2.0	0.9	0.9	...
20693	Concha	7.5	3.9	4.7	...
20104	Douglas	5.2	2.4	2.4	2.5
20663	Florence	2.8	0.8	0.8	...
20689	Gila Bend	10.6	6.8	6.7	...
F296	Gila Riv.	3.0	0.9	1.0	...
20708	Joseph Cy.	2.8	1.0	1.0	...
20482	Hayden	3.0	1.3	...	1.4
F73	Wilson, Idaho	16.8	13.2	11.1	...
20662	Laveen	2.5	1.2	1.3	1.7
20483	Mammoth	6.0	3.7	3.9	4.0
20121	Mesa (R)	3.1	1.0	1.1	...
19761	N. Gila Sch.	9.1	1.9	2.4	...
20486	Oracle	3.0	1.1	1.5	...
20487	Pinal Co. Hwy. Dept.				
	Hayden	7.5	3.0	...	...
20690	Roll	8.7	4.7	...	5.0
19762	Roll Sch.	3.3	1.3	...	...
20664	Roosevelt				
	Sch. Dist. # 66	3.5	1.5	1.9	1.7
F82	San Xavier	3.0	0.9	1.0	...
20772	Sentinel	9.3	6.0	5.5	...
20673	Sentinel (R. R.)	7.7	5.9	4.5	...
F176	St. David, Merrill Sr.	4.6	1.1	1.8	...
20694	Topock	4.7	1.0	...	...
20480	Tucson Brickyard	2.7	1.0	1.1	...
20489	Winkleman	2.8	1.1	1.1	1.0

WATERS NOT ASSOCIATED WITH MOTTLED ENAMEL

20683	Avondale	1.8	...	0.4	...
20656	Benson	0.9	0.4	0.3	...
20122	Chandler	2.1	0.7	0.8	0.8
20491	Clarkdale	1.2	0.3	0.5	0.3
20696	Concha	0.9	0.4	0.3	...
21718	Fairbanks	0.3	0.1	0.4	0.3
20699	Flagstaff	1.1	0.5	0.3	0.2
20490	Jerome	1.1	0.2	0.3	0.1
19769	Pomerene	1.4	0.5	0.3	...
19770	Pomerene Sch.	0.9	0.5	0.6	...
20661	Prescott	1.1	0.2	0.6	0.1
20100	Tombstone	0.2	0.1	0.3	0.0
20665	Wickenburg	1.5	0.1	0.4	0.2
20475	Willcox, Stewart Sch.	1.2	0.3	0.4	0.25
20697	Winslow	0.7	0.2	0.2	...
20859	Yuma	2.0	0.4	0.4	...

Severe mottled enamel of the deeply stained and pitted type appear to be associated with waters containing well over 2.0 p.p.m. of fluorine. Waters containing from 1 to 2 p.p.m. were always found associated with a mild to moderate type of this dental defect. That the lower limit of fluorine content in water which causes mottled enamel probably is slightly less than 1 p.p.m. is shown in Eagar, Tucson Brickyard, Florence (private well), San Xavier, Cochise, and Springerville. These waters were found to produce a very mild type of mottled enamel. In Eagar the effect was variable. About 50 per cent of the children in the community had chalky white patches on the teeth, characteristic of mild mottling. Again it may be noted that other waters with a fluorine content of 0.7 to 0.8 p.p.m. did not have a toxic effect upon the teeth, as, for example, the city of Chandler. This community, however, is surrounded by areas in which mottled enamel does occur and in all probability has a fluorine content which is just below the toxic concentration. It is difficult to establish the exact fluorine concentration in a water supply which will damage the teeth of its users. The evidence indicates strongly that any water with a fluorine content of 0.9 p.p.m. (when analyzed by the Foster, Willard, or Sanchis methods) or over is dangerous from the standpoint of probable damage to the teeth. No Arizona water has yet been found containing more than 1 p.p.m. of fluorine which has not been shown to cause mottled enamel.

Dahle,¹⁷ Associate Referee for the A.O.A.C. has compared the Foster, Willard, and Steiger methods by means of analysis of synthetic waters made by 8 chemists in different parts of the country. His synthetic water "A" made up to contain 2.08 p.p.m. of fluorine was found to contain 2.08 p.p.m. by Foster method, 2.27 by the

Willard method, and 1.9 p.p.m. by the modified Steiger method. Little difference in results obtained by these 3 methods was apparent. Therefore it is safe to conclude that the toxic concentration of fluorine is similar when determined by the Foster, Willard, Sanchis, or Steiger methods, and has as its lower limit 1 p.p.m. or slightly less.

REMOVAL OF FLUORINE FROM WATER SUPPLIES

Because certain communities find it impossible to secure waters containing too little fluorine to cause mottled enamel, a practical method of treating the water to remove fluorine must be developed. Many years ago Carnot¹⁸ reported that it was possible to remove fluorine from water by the use of bone. This removal is probably due to the fact that the CO_3 in bone $\text{Ca}_{10}\text{CO}_3(\text{PO}_4)_6$ can be replaced with fluorine. A single trial in our laboratory has been made of this method. When 67.5 mg. of bone was used per liter of water, the original fluorine concentration of 2.5 p.p.m. was reduced to 1.7 p.p.m. The possibilities of this method are under further investigation.

Willis of the Colorado Springs High School¹⁹ has studied the waters in the mountains above Colorado Springs in an attempt to determine the source of fluorine in Colorado Springs water supply. Analyses of water from the same source showed lower concentrations of fluorine during winter than summer, hence the possibility of "freezing out" the fluorine suggested itself.

Through the courtesy of the Arizona Ice and Cold Storage Company in Tucson it was possible to conduct a freezing experiment under commercial conditions. Water originally containing 0.7 p.p.m. fluorine was fortified with a sodium fluoride solution. A concentration of 3.4 p.p.m. resulted. The tank containing the mixture was placed in the

brine to freeze. Agitation was obtained with compressed air. Two cores were removed. The cake of ice was sampled and analyzed for fluorine by the Sanchis method. Results are shown in Table II.

TABLE II
REMOVAL OF FLUORINE BY FREEZING

	Fluorine in p.p.m.
Original Water	0.7
Water and added NaF	3.4
First Core Removed	6.0
Second Core Removed	4.0
Sample No. 1 Outer Portion	0.7
Sample No. 2 Outer Portion	0.4

It is a well known fact that ice freezes almost pure. In this case the impurities were concentrated in the core. It is doubtful whether this method of fluorine removal would be any more practical than distillation.

A verbal report of Dr. Frary of the Aluminum Company of America, at the meeting of the American Chemical Society in Chicago in 1933—that activated aluminum would remove all traces of fluorine from solution—apparently has not yet been published.

Boruff²⁰ has reported the removal of fluorine from water by the use of aluminum sulphate. Water containing 2 to 3 p.p.m. of fluorine required 85 p.p.m. of the anhydrous salt, or 165 of the crystalline, to lower the fluorine concentration to the safe level of 0.5 p.p.m. At \$4.42 per 100 lb. for aluminum sulphate, the cost of treating 1,000,000 gallons of water would be \$60.77. This cost is prohibitive for municipal supplies. If only drinking water were treated, the cost of 6.07 cents per 1,000 gallons for chemicals would be very economical. No reports of the use of this method have been noted. The writer has attempted to corroborate Boruff's results and especially to modify his procedure to render it more practical by securing more complete removal with less aluminum.

In some cases residual aluminum re-

mained in the solution. Under these conditions fluorine results by the Foster method were lower than by the Willard and Winters method, and it is assumed that aluminum sulphate was responsible for this. Further studies are being conducted to discover the cause.

McKee and Johnson²¹ have recently suggested the removal of fluorine by the use of activated carbon after the pH of the water has been reduced below 3.0. Cost of carbon, acid, and lime will not permit the use of this method by a municipality. The practicability of any of the heretofore proposed methods for the removal of fluorine from municipal supplies seems doubtful. When it is realized that only 1 p.p.m. of fluorine in water is necessary to cause mottled enamel, it is not surprising that attempts to remove these small amounts have not met with greater success.

SUMMARY

1. A concentration of 0.8 to 0.9 p.p.m. of fluorine in water has been found to cause mottled enamel if this water is consumed while the children are of a susceptible age.
2. A comparison has been made of 4 methods for the determination of fluorine in water.
3. Experimental work has shown the Foster method to be unsatisfactory when used for the fluorine determination on waters which have been treated with $Al_2(SO_4)_3$ for fluorine removal if considerable aluminum remains in solution.

ACKNOWLEDGMENT—The writer is indebted to Jane Rider in planning and executing part of the experimental work presented here as well as for a criticism of the manuscript, and to W. T. McGeorge and T. F. Buchrer for suggestions and help in designing equipment used.

REFERENCES

1. Black, G. V., and McKay, F. S. Mottled teeth an endemic developmental imperfection of the teeth heretofore unknown in the literature of dentistry. *Dental Cosmos*, 58:132-156, 1916.
2. Eager. *Pub. Health Rep.*, 16:2576, 1901.
3. Smith, M. C., Lantz, E. L., and Smith, H. V.

The cause of mottled enamel, a defect of human teeth. Univ. of Arizona Agri. Exper. Sta. *Tech. Bull.* 32, 1931.

4. Churchill, H. V. Occurrence of fluorides in some waters of the United States. *J. Indust. & Eng. Chem.*, 23, 9:996-998, 1931.

5. Reynolds, P. S., Ross, W. H., and Jacob, L. D. Volatilization method for the determination of fluorine with special reference to the analysis of rock phosphate. *J. Assn. Agri. Chem.*, 11:225, 1928.

6. Smith, H. V., and Smith, M. C. Mottled enamel in Arizona and its correlation with the concentration of fluorides in water supplies. Univ. of Arizona Agri. Exper. Sta. *Tech. Bull.* 43, 1932.

7. Fairchild, John G. The volumetric determination.

8. Foster, Margaret D. Colorimetric determination of fluorides in water using ferric chloride. *Indust. & Eng. Chem.*, 5:234-236, 1933.

9. Armstrong, W. D. Colorimetric Determination of Fluorine. *Indust. & Eng. Chem. Anal. Ed.* 5:300-302, 1933.

10. Steiger, G. Colorimetric determination of fluorine. *J. Am. Chem. Soc.*, 30:219, 1908.

11. Wichmann, H. G., and Dable, Dan. Determinations of small quantities of fluorine. *J.A.O.A.C.*, Nov., 1933, p. 612.

12. Boissevain, D. H. The presence of fluorine in

the water supply of Colorado and its relation to the occurrence of mottled enamel. *Colorado Med.*, Apr., 1933.

13. Wilcox, L. V. A photronic colorimeter and its application to the determination of fluorine. *Indust. & Eng. Chem.*, 6:167-169, 1934.

14. Willard, H. H., and Winters, O. B. Volumetric method for determination of fluorine. *Indust. & Eng. Chem. Anal. Ed.*, 5:7-10, 1933.

15. Thompson, T. G., and Taylor, H. J. Determination and occurrence of fluorides in sea water. *Indust. & Eng. Chem.*, 5:87-89, 1933.

16. Sanchis, J. M. Determination of fluorides in natural waters. *Indust. & Eng. Chem.*, 6:134-135, 1934.

17. Dable, Dan. Private correspondence.

18. Carnot, A. Recherches sur la composition générale et la teneur en fluor des os modernes et des os fossiles des différents âges. *Ann. Mines*, 9, 3:155-195, 1893.

19. Willis, Willet. The source of the fluorine in some water supplies. *Bull. Colorado State Dental Assn.*, 1934, pp. 39-44.

20. Boruff, C. S. Removal of fluorides from drinking water. *J. Indust. & Eng. Chem.*, 26, 1:69, 1934.

21. McKee, R. H., and Johnston, W. S. Removal of fluorides from drinking water. *Indust. & Eng. Chem.*, 26:849-851, 1934.

DISCUSSION

J. M. SANCHIS

Chemist, Bureau of Water Works and Supply, Los Angeles, Calif.

MR. SMITH has summarized effectively the extent of our present knowledge in regard to the various aspects of the problem presented by the occurrence of fluorides in potable waters.

His timely remarks on the importance of the part played by analytical procedures in any attempt to ascertain the toxic level of fluoride in water, based on field observations, cannot be overemphasized. Without a reproducible unit of measure, little progress can be made in the evaluation of data obtained from widely scattered localities.

As pointed out the methods which have been used most generally in recent years can be grouped into two main classes. Those in one class make use of the fact that fluorides interfere with the quantitative estimation of ferric ions, while those in the other class depend on the effect of fluorides upon the color produced when alizarin reacts

with zirconium in a hydrochloric acid solution.

The Foster method is the best known of the procedures in which use is made of the ferric ion reaction. This came at a time when the inconsistency of the results obtained by the then available methods had thrown laboratory findings into a hopeless state of confusion. Its relative superiority over the other methods caused its ready acceptance by those confronted with the need of making fluoride determinations. However, the results obtained by it were not always reliable nor easily duplicated. Boruff and Abbott¹ pointed out a number of theoretical considerations by which they proved the fundamental weakness of the method even in the absence of interfering substances. When to this is added the effect that reducing agents such as hydrogen sulphide have upon ferric ions, the difficulty in which the thiocyanate colors can be matched when using Nessler tubes or the

Duboscq type colorimeter, the errors introduced by the rapid fading of the color, the need of corrections for the interfering effect of certain ions commonly present in water, etc., it is surprising that results comparable to those given by other methods are so often obtained. It is true that the use of photronic cells and the substitution of other indicators, such as acetylacetone, for the thiocyanate have done much to improve the procedure. It is very questionable, however, that these improvements can overcome the fundamental weakness of the ferric ion reaction.

On the other hand, the relative freedom from common interfering substances of the zirconium alizarin methods places them at a decided advantage over the ferric ion procedures. The Willard and Winter distillation method, as modified by Boruff and Abbott¹ is at this time recognized as the most reliable method at our disposal. Except in very unusual waters, equally satisfactory results have been obtained consistently by the direct zirconium alizarin colorimetric procedures. One of the outstanding advantages of these colorimetric methods over those using the ferric ion reaction is the permanency of the colors produced and the ease with which the colors may be compared with the standards when using ordinary Nessler tubes.

In the matter of analytical procedures, we may say that considerable progress has been made. We have now at our disposal several reliable methods and it is only a question of deciding which of these is best adapted to our needs.

The results obtained by these better procedures indicate that fluoride concentrations in excess of 2 p.p.m. are, as a rule, associated with more or less noticeable defects in tooth structure. Between this concentration and 1 p.p.m. the toxic effect produced by a given quantity of fluoride in the water

seems to vary considerably in different localities. This apparent fluctuation in toxicity suggests that other factors may play an important part in the effect which the fluoride present in the water supply exerts upon tooth enamel.

One of these may be the amount of fluoride taken into the system through articles of diet other than water; another is the possible presence in the water or other food products, of ions which in some way prevent the fluorides from exerting their toxic effects.

Some of the recent work done by Smith and Leverton² at the University of Arizona has shown that the total amount of fluoride ingested, irrespective of its source, is one of the controlling factors governing the production of mottled enamel. As we know, fluorides are present in variable amounts in most of our food products. It is interesting to note that milk and certain vegetables have been considered by physiologists as the source from which the body obtains its normal fluoride requirements. Although there are no experimental data available to establish the relationship between the fluoride content of food products and that of the water which helped to produce them, it seems reasonable to believe that a more or less direct relationship exists. If this were the case, it would be logical to expect that in isolated farms or small farming communities, where practically all foodstuffs are produced locally and where the same water is used for all purposes, the fluoride content of the water will be a deciding factor in controlling its potability. On the other hand, in larger communities, where the water and food supplies are drawn from widely scattered areas, the same fluoride content in the water, within reasonable limits, may not be of much significance.

The second factor to be considered, has to do with the well known physiological phenomenon produced by ion

antagonism usually referred to as the balancing function of salts. A number of cases are known in plant and animal metabolism where the toxicity of certain ions is diminished if not altogether neutralized by the presence of some other ion or ions which by themselves may or may not be detrimental. The extent to which this neutralization takes place depends upon the amount of each ion present, there being a certain proportion at which the balancing effect will be greatest. The Smith-Leverton studies previously mentioned have demonstrated the inhibiting action which calcium exerts upon the potential toxicity of fluorides. This interference, whether due to ion antagonism or merely a solubility effect, clearly indicates the possibility that other untried combinations may bring about similar results.

Definite information on these factors would go a long way toward making possible the intelligent appraisal of the potential toxicity of fluoride concentra-

tions within the doubtful range. This information may, in the absence of practical methods for fluoride removal, even suggest the introduction of substances containing fluoride antagonistic ions in the diet as a logical solution of the problem when a better source of water supply cannot be obtained.

Until more definite information on the various factors involved is available, we may, for the sake of safety, look with suspicion upon waters containing fluoride in concentrations greater than 1 p.p.m.

Much has been learned, but there is still a lot to be known. The foundation has been laid and a wide field of research is open to those who, having the time and facilities, welcome the opportunity to be of service to their fellow men.

REFERENCES

1. Boruff, C. S., and Abbott, G. B. *Indust. & Eng. Chem.*, 5:236-238, 1933.
2. Smith, Margaret C., and Leverton, Ruth M. *Indust. & Eng. Chem.*, 7:791-797, 1934.

School Health Studies

DOCTEUR R. H. Hazemann, M^ed^ecⁱn-Inspecteur, de l'Office Public d'Hygiene Sociale, Prefecture de la Seine, of Paris, writes to the Association that the article by Dr. Donald B. Armstrong, in the January 1935 *American Journal of Public Health*, entitled "Report of Special School Health

Studies in New York City," was so interesting that he translated it into French for a medical meeting even before he had official permission for the translation or copyrighted material. The Association is glad to join Dr. Armstrong in approving the translation of this material.

Relation of Action of Chlorine to Bacterial Death*

C. S. MUDGE AND F. R. SMITH

Division of Dairy Industry, University of California, Davis, Calif.

CHLORINE in the form of gas or of its many compounds has found wide use in public health work. It is perhaps the most popular of the numerous germicides—seemingly an effective agent in causing bacterial death.

This bacterial death, however, is a somewhat misunderstood phenomenon, largely because there are no well defined criteria for it. With bacteria any measure of death is negative, a sort of inverse to life, since one must grow the organisms surviving in order to arrive at the number dead. With animals, any of several phenomena can be used as an index of death—for example, rigor mortis and cessation of heart beat. With higher plants there are criteria, somewhat less well defined, that tell when life is gone, but in the case of bacteria, no such tests exist.

Fulmer and Buchanan¹ have used a vital staining technic which they claim is a satisfactory criterion under certain conditions. According to them, "All cells which take up the stain (methylene blue) are dead, that is, they no longer can reproduce." Five words of this quotation tell the story—"they no longer can reproduce." The reproductive phenomenon in some form is always used in studies of bacterial death; and all our concepts of lethal action are

based on the hypothesis that if the bacteria do not reproduce they are dead.

That this basic premise is incorrect has been shown by Rahn and Barnes.² Although these authors used yeast as a test organism, their results are applicable to bacteria. They subjected bottom yeast to the action of 4 lethal agencies: heat, mercuric chloride, ultra-violet light, and X-rays. At definite intervals the survivors in the cultures were enumerated by the plate count (to show reproduction), gas production (to show enzyme action), staining reaction (to show dead tissue), and coagulation. The cells lost first their power of reproduction, then their enzyme activity. Considerably after losing these 2 powers, they took the stain; and later they coagulated. Data in this paper indicate that for a given time the plate count showed but 0.0002 per cent survivors, whereas the fermentation and stain test showed 5 per cent and 39 per cent living, respectively. Rahn and Barnes consider that the coagulation of the cell protoplasm is not the fundamental reaction of cellular death.

This concept is at variance with a considerable body of opinion to the effect that coagulation is important. Heilbrunn³ accepts the latter view and cites many instances of belief in it. Bancroft and Richter⁴ have studied the action of germicides under the ultra-microscope, using various lethal agents upon yeast cells. They report seeing a

* Read at a Joint Session of the California Association of Dairy and Milk Inspectors and the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

visible coagulation that led them to "understand readily why the cells die." The "death" that they described was, unfortunately, not checked by the usual means. Perhaps the most original part of their work was the direct observation that the coagulation within the cell is reversible. This reversibility they noted; and, if there is any correlation between their coagulation and death, the death process too must be reversible within limits. They further postulate the grossly empirical equation—

Living bacteria + disinfectant = dead bacteria.

Given such an equation, they believe, certain reaction velocities would obtain. Increasing the disinfectant increases the velocity to the right (McClintic).⁵ Increasing the dead bacteria increases the velocity to the left (Lange).⁶ Increasing the living bacteria, however, throws the equation into a "hideous disagreement"—to use their words. It is their idea that the death phenomenon is reversible—a conception not very new in bacteriological literature. A number of authors have reported such findings. Rodewald⁷ placed the organism causing fowl cholera in a 0.1 per cent mercuric chloride solution. After several minutes the cells were removed and washed. Mice inoculated with them were killed. As a control, Rodewald treated a similar quantity of cells in like manner and attempted to grow them. He failed: the cells were "dead." Similar experiments are reported by Liesegang,⁸ Süpfle and Müller,⁹ Müller,¹⁰ and Gegenbauer.¹¹ All these authors treated cells with various germicides, and by subsequent treatment with antidotes were able to cultivate them, whereas the untreated cells showed no evidence of growth.

The experiment of Süpfle and Dengler¹² is exceedingly interesting, since it apparently indicates that the death phenomenon is a function of the medium used to grow the organisms.

Süpfle and Dengler dried anthrax spores upon silk threads, which were then suspended in a steam bath. After various periods of heating, duplicate threads were removed. One was placed in plain broth; the other in broth enriched by sugar and serum. In the richer medium, the spores germinated after exposure to the steam for a longer time—a very significant observation.

Still another argument can be used to indicate the possibility that the death reaction is reversible. Not only Chick,¹³ but Madsen¹⁴ and Nyman, showed that the action of a lethal substance in a bacterial population follows a rather orderly and predictable course: the death rate in such a population depends on the number of cells living at any given time. Expressed mathematically,

$$\frac{d b}{d t} = K b$$

This, on integrating and evaluating the constant of integration, gives

$$K = \frac{1}{t} \ln. \frac{b}{a}$$

In these equations "a" represents the initial number of cells, "b" the number of cells living after time involved, "t" the time, and "K" the rate of death. The second expression is easily recognized as the monomolecular equation so much used by the chemist for the rate of certain reactions. In this case it is an over-all equation reflecting the action of the germicide on the countless individual cells that make up the population. Some contend¹⁵ that the lethal curve does not follow the monomolecular reaction exactly. There is little doubt, however, that the death phenomenon is chemical in nature, and so it must follow chemical laws in other respects and must be reversible or at least must reach an equilibrium somewhat short of actual death.

There is still another possible view regarding the death phenomenon.

Richet,¹⁶ Gegenbauer,¹¹ and later Winslow,¹⁵ and his coworkers¹⁷ have all shown that for most substances, lethal or not, there are concentrations which first stimulate, then inhibit, and later in higher concentrations kill. Gegenbauer postulates zones of life, of dormancy, and of death, but dormancy is not death, though the criterion is likely to be the same—failure to reproduce.

Is it possible in much of the work where "death" has been studied that dormancy alone has been observed and that the cells were indeed alive? If so, most concepts of the action of certain germicides need revision. The work of Leonard¹⁸ apparently leads to the same conclusion. Studying the phenol coefficients of certain compounds, he pointed out that the Hygienic Laboratory makes no claim for this method unless the germicide is closely related to phenol. Those with which he worked were not related. He attempted to determine whether the effect of his compounds was really lethal or merely bacteriostatic—that is, whether he had death or dormancy. To do this he took the 15 minute tubes of the usual test and transferred a loopful of the contents to tubes of fresh broth. In this way the germicide was further diluted. When the transfer was from the phenol tubes there was no growth, whereas the tubes made from his unknown showed growth.

We are especially interested in chlorine compounds, particularly the hypochlorites. These compounds are extensively used in dairy plants and on producing farms. In many instances, particularly on dairy farms, chlorine compounds are the sole means of sterilization. This situation is seemingly justifiable, since the literature is filled with studies made on such compounds. Always the results are reported to be satisfactory. Hypochlorites are supposed to have an exceedingly

high phenol coefficient. Zoller¹⁹ reports 300 for instance; Tilley²⁰ 80 to 90. In the light of Leonard's work, one wonders whether such high phenol coefficients are reliable. Possibly the reaction may be reversible. Furthermore, dormancy or bacteriostasis may have been the pitfall for the unwary in such studies.

We report the results of several experiments on the germicidal action of chlorine compounds. Our procedure was essentially the same as that of many others found in the literature, and the results are in entire accord with theirs. We went just one step farther, however, made observations that to us seem highly significant.

METHODS

For organisms we used milk in which bacteria had grown. This milk had a population well into the millions but contained no clots in which bacteria might be trapped. It was diluted with distilled water in various ratios. The presence of milk in our active mixtures has an excellent precedent in the work of Chick and Martin,²¹ who postulate that the action of lethal agencies on bacteria is best carried out in an environment where bacteria can live. The bacteria in such milk were assumed, furthermore, to represent those forms that the disinfectant must combat in actual practice. Although the flora of our various experiments varied, the constancy of our results left no doubt that the practice was valid. The hypochlorite used was the liquid bleach of commerce, containing about 16 per cent available chlorine. It was strongly alkaline, for there was residual alkali in the container. In order to stop the action of chlorine and thus prevent a bacteriostatic action in the plate, 0.5 c.c. of a sterile 1 per cent solution of sodium thiosulphate was added to each plate which had previously been shown to have no effect on colony counts. Being interested in trends and not in

absolute values, we used only 2 dilutions. Some of the colony counts were exceedingly high. In order to count such crowded plates, we used a dissecting microscope, calibrating the field with a given magnification in terms of the petri dish area. Whenever resort was made to the microscope, 8 to 10 fields were counted, and averaged.

We cannot submit all our experiments for lack of space. Our results, furthermore, do not lend themselves to the process of averaging, dangerous in itself; so we submit a protocol (Table I). The higher numbers of colonies in

sulphate is present than where it is not. It is strange that more workers have not used thiosulphate to offset the effect of the germicide itself. The most interesting observation in our work is splendidly exemplified in the protocol: the 1-10 dilution made in addition to the usual direct plate is always the higher of the two. One may reasonably assume that if the plate made direct from the active mixture shows 5,000 colonies, then the 1-10 dilution should have but 500, but instead of 500, there are 28,000. We found this "jump up" throughout our work, re-

TABLE I

PROTOCOL OF EXPERIMENTS SHOWING THE EFFECT OF CHLORINE ON BACTERIA

Initial bacterial count: 100,000,000

Ratio of milk to water: 1-10

Time of Action of Chlorine, Minutes	Plate Dilution	Concentration of Chlorine p.p.m.	Liquid Bleach	
			No Thiosulphate	With Thiosulphate
3	1-1	50	5,000	294,000
3	1-10	50	280,000	224,000
5	1-1	50	33,000	56,000
5	1-10	50	640,000	160,000
10	1-1	50	48,000	67,000
10	1-10	50	196,000	640,000
3	1-1	100	28,000	5,600
3	1-10	100	600,000	144,000
5	1-1	100	33,000	33,000
5	1-10	100	960,000	960,000
10	1-1	100	33,000	28,000
10	1-10	100	1,312,000	224,000
3	1-1	200	210	2,000
3	1-10	200	4,300	5,800
5	1-1	200	324	2,100
5	1-10	200	1,000	5,800
10	1-1	200	762	3,240
10	1-10	200	3,600	5,040

plates with thiosulphate are to be noted. Particularly important is the fact that the 1-10 dilution gives a higher count than the direct plate (1-1).

A very satisfactory reduction in bacteria was caused by the action of the hypochlorite—a result in accord with the usual findings (Table I). The protocol also shows, as might be expected, that in most cases the counts are higher in the plate where the thio-

gardless of the amount of milk present, the strength of the chlorine, the time of action, or the presence of thiosulphate.

Diligent study has been made of the "jump up," which is doubtless a phenomenon similar to that described by Leonard. The next experiment follows naturally the conclusions of the one above. A mixture of bacteria with water was taken. It was our plan to plate this mixture both before and after

the action of chlorine. To check the plate count which—according to Rahn and Barnes—gives the first evidence of death, we also ran serial dilutions on the same mixture at the time the plates were made. We expected close agreement between the plate and the dilution tube before the action of chlorine. For instance, a mixture showing a colony count of 1,000,000 would also show growth in tubes out to at least the 10^{-6} dilution. After the action of chlorine we thought that there might be a discrepancy between the plate and the tube. The 1,000,000 bacteria (of the previous example) might be reduced to 1,000, as evidenced by the plate count. The serial dilution tubes should not show growth in dilutions greater than 10^{-3} . The experiment indicates the correctness of our reasoning. There is close agreement between the plate and tube before the action of chlorine (Table II, columns 2 and 3), but after no such agreement is noted (columns 4 and 5). The plate count shows the expected decrease up to 99 per cent. The serial dilution tubes, however, show growth in as great dilutions after the

action of chlorine as before. There is, therefore, virtually no reduction as measured by this method (column 7).

By one method there is evidence of death; by the other, no such evidence. Both cannot be right.

Admittedly, errors are inherent in the dilution technic. However, a dilution procedure is also an integral part of the plate method, so that the inherent errors are more or less common in both cases. Furthermore, we obtained these results with such regularity that there is little doubt as to their essential truth. In the light of all the evidence cited, together with that which we submit, there are apparently few tests that can be relied upon where bacterial death is concerned.

SUMMARY

The literature shows that—

1. Bacterial death is to a certain extent reversible.
2. There are "zones" of life dormancy and death.
3. The action of some germicides result in dormancy and not death;
4. The measure of death is sometimes a function of the media used to grow the survivors.

TABLE II

COMPARISON OF THE PLATE COUNT WITH THE SERIAL DILUTION BEFORE AND AFTER THE ADDITION OF HYPOCHLORITE

Time of Action of Chlorine in Minutes	Before the Addition of Chlorine				After the Addition of Chlorine		
	Numbers of Bacteria as Indicated by Colony Count	Numbers of Bacteria as Indicated by Serial Tubes	Numbers of Bacteria as Indicated by Colony Count	Numbers of Bacteria as Indicated by Serial Tubes	Percent Reduction as Indicated by Colony Count	Reduction Indicated by Serial Tubes	
1	3	9.2×10^5	1×10^7	8.5×10^3	1×10^6	98.9	+
	5	8.0×10^5	1×10^7	7.2×10^3	1×10^7	98.8	0
	10	3.0×10^6	1×10^6	1.5×10^4	1×10^7	99.3	0
2	3	1.24×10^4	1×10^5	7.8×10^3	1×10^6	37.0	0
	5	8.9×10^3	1×10^6	7.8×10^3	1×10^6	12.0	0
	10	2.0×10^4	1×10^6	7.8×10^3	1×10^6	61.0	0
3	3	4.9×10^5	1×10^7	4.9×10^5	1×10^7	0.0	0
	5	3.8×10^5	1×10^7	3.6×10^5	1×10^7	4.0	0
	10	3.0×10^5	1×10^7	4.8×10^3	1×10^7	99.0	0
4	3	2.5×10^5	1×10^6	1.2×10^4	1×10^6	95.0	0
	5	1.2×10^5	1×10^6	3.1×10^4	1×10^6	99.0	0
	10	1.9×10^5	1×10^6	1.9×10^4	1×10^5	99.0	0
5	3	2.3×10^7	1×10^6	1.2×10^6	1×10^6	95.0	0
	5	2.5×10^7	1×10^7	7.8×10^5	1×10^5	95.0	+
	10	2.1×10^7	1×10^6	4.1×10^5	1×10^5	95.0	+

Our investigations show that—

1. The colony counts increase as the dilutions increase.
2. There is no accord between colony counts and serial dilutions.
3. Growth was observed in as high serial dilutions after chlorination as before.

REFERENCES

1. Fulmer, E. I., and Buchanan, R. E. Studies on toxicity. *J. General Physiol.*, 6:77-89, 1923.
2. Rahn, O., and Barnes, M. M. An experimental comparison of different criteria of death in yeast. *J. General Physiol.*, 16:579-592, 1933.
3. Heilbrunn, L. V. *The Colloid Chemistry of Protoplasm* (ed. 1), Berlin, Borntraeger, 1928, p. 115.
4. Bancroft, W. D., and Richter, G. H. The chemistry of disinfection. *J. Physic. Chem.*, 35: 511-530, 1931.
5. McClintic, T. B. Determination of the phenol coefficients of commercial disinfectants. *Hyg. Lob. Bull.*, 82, part 2, 1912.
6. Lange, B. Keimmenge und Desinfektionserfolg. *Ztsch. f. Hyg.*, 96:92-117, 1922.
7. Rodewald, K. Über die Widerstandsfähigkeit von Geflügelcholera und Streptokokken gegenüber Sublimat, Carbonsäure und Trypaflavin. *Ztsch. f. Hyg.*, 99:117-124, 1923.
8. Liesegang. Quoted by Bancroft and Richter.
9. Süpfle, K., and Müller, A. Über die Rolle der Adsorption bei der Einwirkung von Sublimat auf Bakterien. *Arch. f. Hyg.*, 89:351-362, 1920.
10. Müller, A. Die Resistenz der Milzbrandsporen gegen Chlor, Pickelflüssigkeit, Formaldehyd und Sublimat. *Arch. f. Hyg.*, 89:363-372, 1920.
11. Gegenbauer, V. Studien über die Desinfektionswirkung des Sublimats. *Arch. f. Hyg.*, 90:23-81, 1921.
12. Süpfle and Dengler, A. Die Bedeutung optimaler Nährböden bei der Prüfung von Desinfektionsverfahren. *Arch. f. Hyg.*, 85:189-197, 1916.
13. Chick, H. An investigation of the laws of disinfection. *J. Hyg.*, 8:92-158, 1908.
14. Madsen, T., and Nyman, M. Zur Theorie der Desinfektion. *Ztsch. f. Hyg.*, 57:388-494, 1907.
15. Falk, I. S., and Winslow, C.-E. A. A contribution to the dynamics of toxicity and the theory of disinfection. *J. Bact.*, 11:1-26, 1926.
16. Richet, C. De l'action de quelques sels métalliques sur la fermentation lactique. *Compt. rend. Acad. d. Sc. (Paris)*, 114:1494-1496, 1892.
17. Hotchkiss, M. Studies on salt action. VI. The stimulating and inhibiting effect of certain cations upon bacterial growth. *J. Bact.*, 8:141-162, 1923.
18. Leonard, G. F. Limitations of phenol coefficient tests in determining germicidal activities. *J. Infect. Dis.*, 48:358-365, 1931.
19. Zoller, H. F. The rate of decomposition of sodium hypochlorite in cows' milk. *J. Dairy Sci.*, 6:310-319, 1923.
20. Tilley, F. W. Investigations of the germicidal value of some of the chlorine disinfectants. *J. Agri. Res.*, 20:85-110, 1920.
21. Chick, H., and Martin, C. J. The principles involved in the standardization of disinfectants and the influence of organic matter upon the germicidal value. *J. Hyg.*, 8:654-697, 1908.

Organized Medical Care

IT would appear that if medical care is provided on some organized basis, it should be possible to define the two fields so that there will be a complete curative and preventive service without any overlapping. In order to attain the fullest coördination, it would be desirable to have the provincial department of health responsible for the administration of all medical services, including hospitals, for which the province assumes responsibility. . . . The public health authority should have in mind that administrative responsibility does not mean a dictatorship. In England, health insurance is administered centrally by the Ministry of Health, which also appoints the regional officers, who act as medical referees and inspectors. The Ministry, in the exercise of its administrative powers, turns to the British Medical Association for advice and assistance. The strength of health insurance in England is largely

due to placing control for the professional side of the medical benefit with the medical profession. This is something for public health authorities to keep in mind, if they are ever called upon to administer some form of organized medical care.

A fair criticism of health insurance is that it has not been preventive in practice and but little in outlook. It is not enough to render lip service to the idea of the practice of preventive medicine by the general practitioner, and then to disregard him in planning public health services. Under whatever name organized medical care is provided, it should make possible the systematic practice of preventive medicine, including periodic health examinations, by the general practitioner. . . .—The Relationship of Public Health to Medical Care, Grant Fleming, M.D., McGill University, Montreal. *Canad. Pub. Health J.*, Oct., 1934, p. 465.

Training Sanitary Inspectors*

WALTER S. MANGOLD, F.A.P.H.A.

*Sanitary Instructor, Los Angeles County Health Department,
Los Angeles, Calif.*

AN interesting experience in what a trained layman can accomplish is related by Dr. W. G. Smillie, Professor of Public Health Administration, Harvard School of Medicine:

Some years ago in Alabama an active campaign was being waged for the control of tick fever in cattle. Federal authorities aided by other specialists met with considerable opposition in certain areas. This took the form of having dipping vats dynamited and being shot at from ambush. As officials were discussing their predicament one evening, they were called on by a townsman, one John Boggan, who offered to help them. He suggested that he be taught the control methods and other facts about this disease, and then he would be willing to put these measures into practice. At the end of a short schooling, Mr. Boggan, who was amply supplied with native intelligence, went into the troublesome districts and successfully instituted the tick eradication campaign. This incident is applicable to the work of the sanitary inspector.

In the city of Washington, in 1922, a group of public health officials and educators held a conference to consider means of bettering the public service. Among their conclusions were the statements that the future of public health

did not depend so much on new scientific data or a well informed public as it did on the matter of personnel. Dr. C.-E. A. Winslow, Yale School of Medicine, stated at that time, in reference to the specialists whose viewpoint and training are primarily concerned with the nonliving environment of man:

We may naturally place in this general group one of the most important and neglected figures in the whole public health campaign, the inspector in the control of sanitary conditions and in supervision of food supplies. There is urgent need for a large group of men or women who do not necessarily require a college education but who do need substantial training of an elementary kind for which as yet no provision whatever has been made in the United States.

Edna Trull corroborates these statements in a study of this position. She finds that the statement "the health inspector is one of the most influential agents of the city in promoting and safeguarding the health of its citizens" cannot be questioned when the scope and importance of his duties are taken into consideration. "When the amount of personal responsibility, initiative and good judgment required of an inspector are taken into account, it is apparent that his training, ability, and status in the administrative personnel are entitled to consideration similar to that given to the other protective forces of the community."

The duties of the sanitary inspector have increased rapidly from the begin-

* Read at a Joint Session of the California Association of Sanitarians and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

ning of this century to the present time. Formerly, the inspector acted as quarantine officer and enforced general nuisance laws, but with the advancement of the sanitary sciences, new methods for the detection, diagnosis, and control of communicable diseases were adopted. Higher standards of community sanitation also prevail over those of 30 years ago. All this has entailed new duties of a semi-professional nature which require, at the very least, a casual acquaintance with many sciences and an intimate knowledge of enforcement procedure. The inspector's daily routine now brings him into the field of medicine, sanitary engineering, bacteriology, chemistry, veterinary science, law, entomology, architecture, trade practices, and business management. To expect any ordinary individual to pick up the necessary information in a haphazard manner and efficiently to execute his mandatory duties is beyond reason. The only equitable solution to such a problem is to institute a well planned course of training which embodies the fundamental principles of environmental sanitation and standardized methods of procedure.

The health officer or specialist need not fear the increased knowledge and efficiency of the inspector for, rather than encroach upon the expert's field, the inspector relieves the technician of many of his routine duties. He thereby becomes a reliable worker supplementing, not obstructing, the work of his superior officers. Due to his broader understanding of the general affairs of the health department, the inspector through his extended field of contacts, becomes a valuable aid to the health officer in promoting public relations and assisting in special feature programs.

The need of training is felt not only in this country but in others where the control of certain communicable diseases is imperative or desired. A recent book on public health in the Union of

Soviet Socialistic Republics contains the statement that, although the number of cases of dysentery, typhoid fever, typhus and relapsing fever is abnormally high, "there is no complete provision, as yet, for the special training of sanitary officers, or for insisting on their possessing a satisfactory diploma before they undertake public health supervision and control."

The only country which has satisfactorily dealt with this problem is England, where, as early as 1877, the Royal Sanitary Institute organized courses of training for sanitary inspectors. It is practically impossible for an individual to receive appointment as sanitary inspector without holding a certificate of proficiency from this non-official organization.

In the United States, many attempts have been made to establish this type of training. The most outstanding measures are those in effect in New Jersey, Tennessee, and Los Angeles County. In the first state, the legislature in 1903 passed laws for the licensing of sanitary inspectors; amendments in 1920 set up 3 classes of inspectors. These regulations have been supplemented by summer short courses at Rutgers University.

The Tennessee State Department of Health coöperates with the University of Tennessee in training inspectors for a 3 months' full-time period. These students are trained specifically for positions with the county health units. The regulations of the state department establish the following requirements for sanitary inspectors in county health departments: certificate of good health, necessary personal and moral qualifications to carry on their work adequately, high school graduate, 3 months' special instruction in sanitation or its equivalent, and at the time of initial appointment must be not less than 25 years of age, nor more than 35. This standard is probably the highest for any health department in this country.

In the Los Angeles County Health Department, a School of Sanitary Instruction was organized in 1930 and a full-time position of Sanitary Instructor created. This school has successfully completed 12 courses of instruction ranging from the fundamentals of sanitation to classes in teacher training.

There has been a group of inspectors working under the name of the California Association of Sanitarians who have twice presented to the state legislature a bill for registering sanitary inspectors. This measure would allow all inspectors to register during the first year after enactment without examination and, thereafter, a course of training from a certified school followed by an examination would be required before a registration certificate would be issued. The bill will be presented again to the next session of legislature.

The School of Government, University of Southern California, during the last 4 years has given certificates for certain types of governmental services. It is now considering the establishment of courses leading to a Certificate in Public Health Sanitation. To this end a graduate student, Grace Loye, is making an analysis of the duties of the sanitary inspector in Southern California, and also the required knowledge to execute these duties. Plans will be submitted to the American Public Health Association for correction and approval.

At this time I wish to submit the following plan which is based on the opinions of public health leaders and educators in this country:

1. That the American Public Health Association establish a Board for Certification of Sanitary Inspectors with a full-time executive secretary. Such board shall promulgate rules, procedure for certification, standards, and fees.

2. The Board shall appoint State Boards of Examiners to conduct examinations and certify applicants to the Association.

3. The Board shall set up a standard course of instruction for schools to teach. After 2 years, only those who have taken such a course will be eligible for examination.

4. The U. S. Public Health Service and Rockefeller Foundation should be encouraged to coöperate with this plan in those counties where grants are given for public health work.

A simple course requiring 168 hours of class and 132 hours of field work could be organized so that it may be given at a full-time school, night extension classes, or by a correspondence course supplemented by full-time attendance at a coöperating health department. Consideration should also be given to printing a manual of standardized procedure. Although universities ought to give this training, the courses should not be overloaded with university subjects but should rather apply to actual field conditions.

This plan agrees with the objectives of the Committee on Training and Personnel as published in the *American Public Health Association Year Book, 1932-1933*. The program of the committee proposed the following:

1. The definition of different types of public health workers

2. Registration of those workers who are now in service

3. The setting up of definite standards under which individuals may qualify for registration in the future

4. The development of a campaign of popular education for better tenure, adequate salaries, and the appointment of trained workers in the future

5. The development of suitable licensure legislation to necessitate the appointment of trained individuals

In fact, the proposed bill of the California Association of Sanitarians and the proposed certificate course of the University of Southern California both fit into the objectives of this committee.

The training and certification of sanitary inspectors should be given serious consideration at this time before public health departments return to their normal budgets. Such training will give the inspector an opportunity to give better service and entitle this position to a justifiable increase in salary.

BIBLIOGRAPHY

American Public Health Association *Year Book*. Report of the Committee on Training and Personnel. 1932-1933.

Mangold, Walter S. *The Evaluation of Functional Training for Inspectional Services*. Los Angeles County Health Department. May 30, 1933.

Mangold, Walter S. *Sanitation in the United States*. Los Angeles County Health Department. June 1, 1932.

Trull, Edna. *The Administration of Regulatory Inspectional Services in American Cities*. Municipal Administrative Service, New York, 1932.

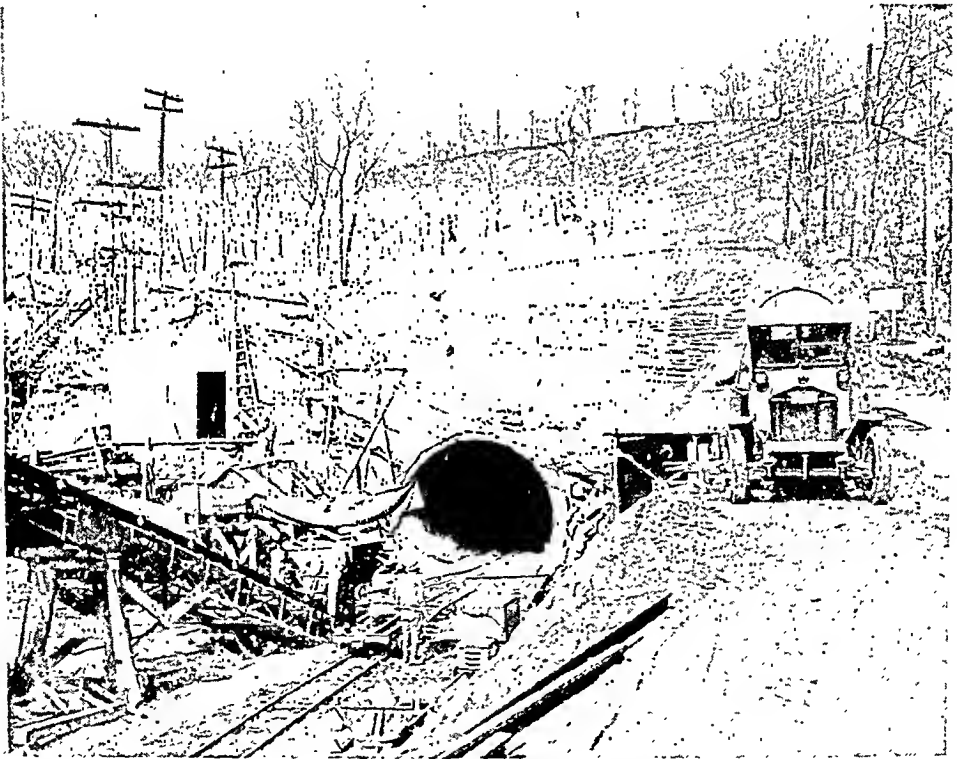
Public Health Bulletin, No. 126, The Future of Public Health in the United States and the Education of Sanitarians, 1922.

News holme, Sir Arthur, and Kingsbury, John A. *Red Medicine*. Doubleday, Doran & Co., Inc., New York, 1933.

New Jersey State Department of Health, *Public Health News*. April, 1932.

The Royal Sanitary Institute, *Calendar of Courses of Lectures and Demonstrations*. London, England. Session, September-April, 1930-1931.

Tennessee State Department of Public Health, *Manual for Conduct of County Health Department*. March, 1931.



General view of the mouth of the Minneapolis-St. Paul sewer. This sewer is to be 24 miles long and will be located about 250 feet under the city. In the background are the historic Indian mounds under which the sewer will be tunneled. The car in the foreground is being loaded with concrete from the mixer. The Minneapolis-St. Paul Sewer District received an allotment of \$16,095,000 from the Public Works Administration for this project which will take about 3 years to complete.

Response of the Peritoneal Tissue to Dusts Introduced as Foreign Bodies*

R. R. SAYERS, M.D., F.A.P.H.A., J. W. MILLER, AND W. P. YANT

Surgeon, U. S. Public Health Service, Washington, D. C., Acting Assistant Surgeon, U. S. Public Health Service, Washington, D. C.; and Superintendent, U. S. Bureau of Mines Experiment Station, Pittsburgh, Pa.

IN recent years much interest has been shown in the response of body tissues to various dusts. The action of inhaled dusts has been studied extensively by Gardner, Mavrogordato, Gye, and others. Gye and Kettle,^{1, 2} have studied the response to dusts injected intratracheally and subcutaneously. Pollicard^{3, 4} has used the cornea and conjunctiva as the sites of study in his experiments. In 1924 experiments were begun at the Pittsburgh station of the U. S. Bureau of Mines⁵ to determine the action and fate of various dusts when injected into the peritoneal cavity of guinea pigs. The conclusions reached at that time were that live animal tissue in all parts of the body tends to react in essentially the same manner to foreign bodies, and that fibrous tissue is formed in the peritoneal cavity by quartz and is not formed by limestone or coal.

Owing to the length of time required to obtain a reaction from dust by inhalation methods and the desirability of determining the harmfulness of a dust in a relatively short time, the peritoneal cavity was chosen for the site of study.

This area is relatively circumscribed, exact quantities of dust can be easily and accurately injected, and the sterility of the material introduced can be preserved. The reaction produced by the dust in the peritoneum is essentially the same as that produced in the lungs. Identical reactions were found in each animal injected with the same material, under the same conditions and examined at the same interval after injection. The gross appearance of the dust nodules was sufficiently differentiated to afford a means of classifying the physiological response to the dusts.

Any dust, when first introduced into the peritoneal cavity, produced a foreign body reaction of varying degrees of severity. This injury subsided in from 1 to 3 weeks. The dust formed nodules of different sizes and shapes. The subsequent behavior of these nodules determined the type of reaction.

In the series reported here, there were 3 distinct types of reaction; an absorption, a proliferative, and an inert reaction. The absorption reaction consisted in the gradual disappearance of the dust from the tissues without the formation of scar tissue. In the proliferative reaction the nodules formed by the dust due to cellular proliferation became progressively larger up to a certain limit, after

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

which they became fibrosed. In the inert type of reaction the amount of dust found in the peritoneal cavity at the end of 360 days was approximately the same as that noted in 7 days. The nodules, however, changed in shape, became more flattened, and often showed considerable dispersion of dust particles into the surrounding peritoneum.

In preparing the dusts for injection it was desirable that the particle size of each in the series conform as closely as possible to that of the others. In one series of tests, particles that passed through a 325 mesh standard sieve were used. These were less than 43 microns maximum size. In another series, the material was elutriated in a Roller type air separator.⁶ By this method less than 5 μ maximum size were obtained for all of the dusts, with the exception of soapstone, for which the maximum was 8 μ . The median particle size obtained by air separation varied from 0.75 to 1.7 μ (soapstone 3.5 μ). Such small variations in particle size appeared to be of no importance in comparing the physiological responses produced. The air separated particles closely approximate in size those inhaled under industrial conditions.⁷ While the smaller particles were preferable because of their greater assimilation by the cells and the type of reaction was apparent earlier, the 325 mesh material gave the same gross reactions, and material this size is easily obtained without the necessity of expensive apparatus.

A 10 per cent suspension of the dust (previously sterilized in a hot air oven for 1 hour at 150° C.) in sterile physiological saline solution was prepared. Two c.c. of this suspension, equivalent to 0.2 gm. of dust, was injected intraperitoneally into each guinea pig under aseptic conditions. The animals injected with the air separated material were killed and examined 7, 14, 30, 56, 90, 180, and 360 days after injection, and those treated with the 325 mesh

material were examined in 7, 14, 30, 56, and 112 days after injection.

With the exception of bituminous coal, the greater part of each of the dusts in this series was found in the peritoneum of the anterior abdominal wall, the most dependent portion of the peritoneal cavity. The site of the next largest collection was the omentum. Small nodules and dispersed collections of dust particles were also found in the inguinal canals, on the mesentery, liver, intestines, testes or uterus and diaphragm. A small amount of dust was occasionally found on the posterior abdominal wall. In the case of bituminous coal, the greater portion was found in the omentum and mesentery, while a relatively small part was present on the anterior abdominal wall. For comparison in describing the reaction, the nodules on the anterior abdominal wall were used.

PERITONEAL RESPONSE TO THE VARIOUS DUSTS

Calcite, limestone, precipitated calcium carbonate, gypsum, and Portland cement, after being injected into the peritoneal cavity, formed irregular, more or less discrete nodules. In the earlier stages, some congestion and edema was noted about the edges of the nodules. This irritation was relatively slight in all of these dusts except cement, where it was quite severe, due possibly to the chemical qualities of the dust. The initial stage of foreign body irritation had subsided before the end of 30 days after injection. The nodules became progressively smaller as the interval between injection and examination increased; and the decrease in size was accompanied by the production of a fine brown pigment, which appeared at the edges and on the surfaces of the nodules. Gypsum alone of these dusts did not cause the formation of the pigment. The original dust eventually disappeared leaving only brown pigment

particles at the sites of the nodules. Later the pigment likewise decreased in quantity, and in some animals disappeared entirely without the formation of scar tissue. This response, consisting of the disappearance or dissolution of the dust from the tissues has been designated, for the sake of description, as one of absorption.

Quartz and chert, after an initial stage of foreign body irritation similar to that noted in the previous group of dusts, produced nodules which became progressively larger in size. These nodules showed a tendency to fuse together. They presented the gross and microscopic appearance of cellular proliferation. The increase in size continued to progress up to 90 days after injection, after which it remained constant. The nodules then became more indurated and fibrosed. At the end of 360 days fibrosis was well marked. This type of reaction has been called one of proliferation. The chert used was highly siliceous.

Soapstone, carborundum, jewelers' rouge (hematite), anthracite coal, bituminous coal and precipitator ash produced the same type of foreign body reaction in the first 2 weeks as was noted with the other dusts. The early fixation reaction was not severe and subsided quite rapidly. The nodules, at first raised and rounded, became flattened and spreading with irregular edges. Numerous fine isolated particles were noted in the peritoneum adjacent to the nodules. Collections of dust particles were found at various other points in the peritoneum. The amount of dust found in the peritoneal cavity 360 days after injection was approximately the same as that noted in 7 days after injection. The injected dust was neither absorbed nor did it initiate a cellular proliferation. The only change noted was that of the distribution of the dust in the peritoneum. This type of reaction has been classed as one of inertness.

SUMMARY

The tissue of the peritoneal cavity responds actively to a dust introduced as a foreign body, the response being of such a character that it may be used as a basis for the classification of industrial dusts with reference to their pneumoconiosis producing properties. This response falls into 3 groups; absorption, proliferation, and inertness. While the animals were kept on test for as long as 360 days, the response was sufficiently well marked in 90 days to determine the type of reaction, and often, conclusions could be reached in 30 days, particularly if the reaction was one of absorption or proliferation. The reaction produced by each dust was constant and uniform in all animals injected with that dust. It appears that this response of the peritoneal tissue to various dusts can be used to indicate the possible harmfulness of an industrial dust.

CHEMICAL AND PETROGRAPHIC ANALYSES OF THE DUSTS

Calcite—Pure Iceland spar. Chemical analysis showed calcium carbonate, 99.8 and silica 0.1 per cent. Petrographic examination showed a high purity calcite. Median size of the particles, 1.4 μ .

Limestone—A high grade Pennsylvania limestone. Chemical analysis: calcium oxide, 54.4 per cent; magnesium oxide, 0.4; iron and aluminum oxides, 0.4; and silica, 1.5 per cent. Petrographic examination showed granular, irregularly rounded calcite. Median size of particles, 1.45 μ .

Precipitated calcium carbonate—A chemical by-product. Chemical analysis: calcium carbonate, 87.9; magnesium carbonate, 10.0; magnesium oxide, 0.1; iron and aluminum oxides, 0.6, and silica, 0.4 per cent. Median size of particles, 1.28 μ .

Gypsum—The uncalcined, natural mineral. Silica, 1.3 per cent. Petro-

graphic examination showed approximately 30 per cent as calcite in the form of rounded granules and irregular rhomboidal crystals and approximately 70 per cent as fragmented particles of gypsum. Median size of particles, 1.3 μ .

Portland cement—Chemical analysis: calcium oxide, 74.4; magnesium oxide, 2.8; silica, 21.1 per cent. Petrographic examination showed normal Portland cement. The particles were sharp and angular. Median size of particles, 1.5 μ .

Quartz—Two specimens were used. One was ground rock crystal of high purity. Chemical analysis showed 99.4 per cent of silica. Petrographic examination showed clear, crystalline normal quartz. Median size of particles, 1.7 μ . The other specimen was finely ground Pennsylvania quartz, commonly known as flint. Chemical analysis showed 99.1 per cent silica. Petrographic examination showed normal quartz of high purity. Median size of particles, 1.6 μ .

Chert—A highly siliceous chert. The waste product from the concentration of lead and zinc ores. Chemical analysis showed 76.1 per cent silica. Petrographic examination showed quartz and chert, stained with limonite, predominating. About 25 per cent of the silica was normal angular quartz fragments. Median size of the particles, 1.22 μ .

Soapstone—Chemical analysis: total silica, 49.9; calcium oxide, 1.7; magnesium oxide, 26.2 per cent. Petrographic examination showed about 30 per cent as tremolite, about 65 per cent as talc and about 5 per cent as dolomite. Median size of particles, 3.5 μ .

Carborundum—Pure manufactured silicon carbide. Petrographic examination showed no impurities. Median size of particles, 1.15 μ .

Jewellers' rouge—Pure ferric oxide in

a finely divided state. Chemical analysis: ferric oxide, 98.3; silica, 1.5 per cent. Petrographic examination showed a high purity hematite as fine uniform particles. Median size of particles, 0.95 μ .

Anthracite coal—Two specimens of Pennsylvania anthracite were used. The chemical analyses were approximately the same. Petrographic examinations showed about 95 per cent as coal and about 5 per cent as inorganic material. Of the latter, about 60 per cent appeared as quartz and about 40 per cent as calcite, siderite and rutile. Median size of particles, 0.75 and 1.11 μ .

Bituminous coal—Two samples of Pennsylvania bituminous coal were used. Chemical analysis showed one to have 8.5 per cent ash of which 0.8 per cent was silica, and the other to have 8.0 per cent ash of which 3.5 per cent was silica. The median sizes of the particles were 1.15 and 1.19 μ .

Precipitator ash—Collected from stacks by electrical precipitation. Chemical analysis showed 44.7 per cent silica. Petrographic examination showed predominately perfectly spherical fused glass, rounded semifused masses made up of crystallites, some quartz fragments, calcite and coal. Median size of particles, 1.43 μ .

ACKNOWLEDGMENT

Special acknowledgment is made to the Metropolitan Life Insurance Company, which defrayed part of the expenses incurred in the study. Acknowledgment is also made to the kindness of W. A. Selvig and Dr. A. Gabriel of the U. S. Bureau of Mines for the chemical and petrographic examinations of the dusts used in these experiments.

REFERENCES

1. Kettle, E. H. The Interstitial Reactions Caused by Various Dusts and Their Influence on Tuberculous Infections. *J. Path. & Bact.*, 35:395-405 (May), 1932.
2. Kettle, E. H., and Hilton, R. Technique of Experimental Pneumoconiosis. *Lancet*, 1:5675:1190-1192 (June), 1932. (Continued on next page)

3. Policard and Rollet. Réactions du tissu cornéen vis-à-vis des particules minérales siliceuses. *Bull. d'hist.*, 8:53-58 (Feb.), 1931.

4. Policard and Mouriquand. Sur les réactions provoquées dans le tissu conjonctif par l'introduction de particules microscopiques d'amiant. *Bull. d'hist. appl. à physiol. et pathol.*, 7:193-199 (June), 1930.

5. Sayers, R. R. Health Hazards in the Mining

Industry. *U. S. Bureau of Mines Report of Investigation*, No. 2660, Dec., 1924.

6. Roller, P. S. Construction of Accurate Air Separator. *Indust. & Eng. Chem.*, 4:341-343 (July 15), 1932.

7. Bloomfield, J. J. The Size Frequency of Industrial Dusts. *Pub. Health Rep.*, 48:961-968 (Aug. 11), 1933.

Immunize Now

DIPHTHERIA immunization has been chosen by the May Day Committee of the State and Provincial Health Authorities of North America as the May Day-Child Health Day project for 1935. It was chosen because there has been practically no reduction since 1930 in the number of deaths from diphtheria throughout the United States. Some states have accomplished a marked reduction in the number of deaths, hence it follows that others have a proportionate increase, indicating that the proven method of prevention has not been satisfactorily applied. . . .

Believing that immunization should be the work of the private physicians, and in order to obtain the coöperation of physicians in this work, we offered the suggestion to each state health officer in the United States that he send a communication to each physician in his state urging:

That he remind his patients who have children under school age of the need for immunization

That he ask his patients to bring their children to be immunized

That he make it a routine of his practice

in the future to immunize, during the first year of life, all babies under his care.

Even with certain states nearing the goal of No Deaths from Diphtheria, the Health Officers who have been heard from have responded enthusiastically to this suggestion. Officers of the U. S. Children's Bureau, the U. S. Public Health Service, the American Academy of Pediatrics, and the American Pediatric Society, promised that those organizations will coöperate.

The objective of the plan is to immunize all children between the ages of 6 months and 6 years, and to maintain this as a continuing service. Concerted action by state departments of health, the medical profession, and parents should make the accomplishment of this objective possible. Our task is to assist in getting information on the need for immunization to parents in all communities and to urge them to act without delay. . . .

Since the entire plan is based upon the coöperation of departments of public health and the medical profession, *both should be consulted* in any community plans for diphtheria immunization.—*A.C.H.A. News Release.*

Occupational Hazards in the Agricultural Industries*

ROBERT T. LEGGE, PH.G., M.D.

Professor of Hygiene, University of California, Berkeley, Calif.

BEFORE the modern age of motorization, power, electricity, and the use of chemical products, such as insecticides and other poisons, the farmer, in his rural out-of-doors occupation, enjoyed the reputation of holding first place in longevity tables, but a recent census report on morbidity statistics, shows a 20 per cent reduction in urban infectious diseases, whereas in the rural communities the decrease is only 6 per cent. This is due to better medical care and public health program in our cities, and also to the fact that diseases such as malaria, hookworm, dysentery and diarrhea are more prevalent in the country. On the other hand, we find the farmers' daughters have about one-half the incidence of tuberculosis as the young women of the same age group working in the industries in the city.

Agriculture has developed many specialties, such as cattle and stock raising, dairying, horticulture, floriculture, truck gardening, cotton, forage and grain farming. As new mechanical processes were invented and the chemical and biological sciences developed, agriculture became an industry and farming was no longer a trade, but a profession.

It is rather difficult to secure mor-

bidity reports from rural districts, and to determine the exact number of non-fatal accidents, since they are not reported to health officers as is customary in large cities.

OCCUPATIONAL ACCIDENTS

In most states, the farmer does not come under the Workmen's Compensation Act; and in those states which form the exception, only if the accident or death is the result of machinery or occupational disease. The number of accidental deaths among farmers and farm laborers in California for 1933, reported by the Industrial Accident Commission, was 67 out of a total of 401 claimed as a result of all causes chargeable to industry. The 67 deaths resulted from accidents arising from the use of farm machinery, such as tractors and motors, falls, fire, electric shock, run-aways, and kicking and horning by animals. Only 2 other vocations had higher mortality rates. Seventy-nine hundred and fourteen non-fatal accidents were reported, placing agriculture first in the 35 tabulated industrial divisions listed.

The toll of accidental deaths in agriculture is annually increasing due to the introduction of motor driven farm machinery and electric power. In some agricultural states, Nebraska as an example, in 1929 the accidental deaths on the farm were twice as numerous as those in the manufacturing industries.

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 5, 1934.

In Kansas during the same year, of the 159 agricultural deaths, 22 were due to non-auto vehicular accidents—18 from farm wagons and 4 from hay racks; 25 were due to animals—kicks and falls from horses, gorings and injuries by cattle. Electricity took a toll of 37 victims, 8 of these being struck by lightning. Of 83 drownings, 5 occurred in stock tanks. Forty-nine persons were killed by special farm machinery, such as balers, thrashers, gang plows, and harvesters. In Nebraska and Kansas, 145 fatalities were caused by tractors, this important modern power machine taking first place as a cause of death and occupational accidents. Carbon monoxide asphyxiation from gas engine exhausts, falls from trees, etc., played a part in the fatal accidents.

The average age at death for the agricultural worker is 56.3 years, according to the U. S. Bureau of the Census life tables published in 1910.

In 1932 there were 15,000 accidental deaths among those engaged in gainful employment. The National Safety Council classified 3,500 of these as belonging to the agricultural occupations. In the same year, the Kansas State Board of Health listed 195 industrial deaths, 105 of these occurring in agricultural pursuits. The most common cause of fatality in connection with agricultural work was farm machinery, followed in order by injuries by animals, falls, lightning, and excessive heat.

Official reports for Canada for 1932 give the number of fatal industrial accidents as 961, of which 154 were chargeable to agriculture.

In England, according to the records of the Registrar General for 1900–1902, the death rate for occupied males in agriculture as compared with all males in the age group between 15 and 65 was 13.61 to 16.23.

According to the United States Census of 1930, the number of gainfully occupied males from 15 to 64

years of age was 14,013,367, with deaths from all causes 121,951 or a death rate of 8.70 per 1,000. The agricultural workers numbered 2,008,330, which included farm owners, managers, and laborers; and deaths from all causes were 13,479, or 6.71 per 1,000. The accidental death rate of this group of agricultural worker was 15.8 per 100,000 from all causes.

OCCUPATIONAL DISEASES AS A RESULT OF PLOWING AND HARVESTING

In our southern states, hookworm is common among the farmers and their families. Especially is this disease more prevalent where sanitation is lacking and field workers go barefooted. In the tropical rice, tea, and rubber plantations, it has been estimated that 60 to 80 per cent of the coolie farm laborers harbor this parasite.

One of the well known irritants to the unbroken skin is lime dust, prevalent during the period in which the tillers prepare the soil, spreading lime on the fields. Manure from herbivorous animals is used especially for the fertilization of the field and truck gardening. It is believed that horse manure contains many tetanus organisms. The danger of tetanus is greater in injuries among tillers of the soil and barnyard workers than among city workers, since the automobile has replaced the horse drawn vehicles.

The so-called tropical skin disease, the classical disease due to prolonged exposure to heat and light of the sun's rays, has long been known to agriculturists on the prairies of Kansas as "farmer's skin." In Kansas in 1932, 6 deaths were reported as due to excessive heat.

Pollens and irritating dusts from plants cause considerable morbidity among field laborers. I recall one farmer who on account of hay fever was obliged to vacate his hay ranch annually to go to the seashore when the red top

and timothy were being harvested. In California, annually, tons of hops are produced for export and home consumption; the hops produce fine hair-like processes, which produce the so-called hop pickers' ophthalmia.

OCCUPATIONAL DISEASES AMONG GRAIN AND FORAGE RANCHERS, TRUCK GARDENERS AND NURSERY MEN

In the harvesting and storing of grain, hay, and different forages, certain bronchial and dermatological lesions are likely to develop especially when these products are infected with mites and moulds. The dusts produced may be contaminated with spores of certain fungi; for example, the *Aspergillus* and *Penicillium*, which when inhaled produce asthma and a bronchial infection. Patients with early cases have coughs and muco-purulent expectoration but no fever, while advanced patients present all the symptoms of tuberculosis. Two such cases were treated among college boys, sons of farmers, who contracted the infection during the summer vacation. One was entirely cured by administering iodides and a vaccine. The sputum shows conidia and spores of the fungi with fragments of mycelium.

Sporotrichosis is another fungus disease due to one of the *Sporotrichum* species, which it is said, is saprophytic on certain vegetables, such as lettuce, and found on the barberry (*Berberis thumbergii*). Truck gardeners and nursery men may become infected. The lesions produced are indurated, chancre-like swellings of the skin which may ulcerate and involve the lymphatics. The administration of iodides internally with tincture of iodine locally is reputed as specific. According to L. Schwartz, U. S. Public Health Service, dermatitis due to plant poisoning among gardeners and florists was due to this cause.

Certain grain regions are infected by a mite; the *Pediculoides ventricosus*

causes the farmers handling the grain and straw to have a skin disease characterized by intense itching with an urticarial eruption. To the late Dr. J. F. Schamberger, of Philadelphia, belongs the priority in describing this affliction in this country (1910). The writer of this paper published in 1921 an article on what was called in California "Packers' Itch." Infected straw, used at a tile works and an electrical fixture factory, caused the itch. The mites were found on the straw. Fumigation and exposure of the straw to sunlight destroys the mite.

Floriculturists frequently suffer from dermatitis venenata, usually on the hands and arms, from coming in contact with certain plants. It is estimated that about 60 plants possess this irritating effect, notably primulas, sumac, pyrethrum, and chrysanthemums. The worst offender affecting farmers and lumbermen of the Coast Range Mountains of California is the *Rhus diversiloba* (poison oak). This plant produces an itching erythema which often develops into vesicles and bullae with marked swelling. The active principle is due to lobinol, isolated by McNair in 1921. The handlers of these plants constitute a considerable percentage of cases of occupational dermatitis: in New York state out of 449 cases, 14 per cent, and in Ohio out of 4,600 cases, over a 5 year period, 2 per cent.

OCCUPATIONAL DISEASES DUE TO PARA- SITES AND INSECTS

Examples of certain infections resulting from contact with animals and plants have been given in this paper. For elaboration, consult a work on medical entomology and note the various vectors, parasites, moulds, and scales that are responsible for infecting agricultural workers. The itch mites (*Sarcoptes*), the wood ticks (*Ixodes ricinus*), the various ringworms (*Trichophyton*), and scald head (*Favus*),

are examples of etiological factors. There is also a common dermatomycosis that attacks stockmen, caused by the *Ectothrix trichophyton* which produces a ringworm, a common infection of horses and cattle.

Certain meals used for feeding dairy stock contain a mite known as the *Tyroglyphus* which produces an itch of the hands. This is the so-called "Grocers' Itch." Linseed meal or meal cake also causes an eczematous eruption on the hands of the dairyman.

In California during the past few years, several cases among farmers have been reported of "bites" by the Black Widow spider (*Lactrodectes mactans*). This highly poisonous insect inhabits old out-buildings, particularly privies, barns, and stables. Most of the cases reported were bites on the genitals or extremities. Several of the cases were operated upon under the mistaken diagnosis of perforating ulcer due to board-like rigidity of the abdomen. The victims of Black Widow spider bites become desperately ill and some die.

The apiarist also has his stings from the honey bee (*Apis mellifera*).

OCCUPATIONAL DISEASES AMONG CATTLE AND DAIRY MEN DUE TO ANIMAL INFECTIONS

One of the earliest skin lesions found on the hands of dairy maids was cowpox or vaccinia, which Edward Jenner observed. His studies led to his epoch-making work on vaccination for the prevention of smallpox.

Glanders, a highly infectious disease due to *Bacillus mallei*, found among horses, mules and asses, is frequently conveyed to man. The author has had 2 cases among farmers, 1 resulting fatally.

Anthrax, or malignant pustule, is occasionally found among shepherds, shearers and farm laborers. Out of 143 deaths tabulated by Andrews from 1910 to 1917 in U. S. Registration Area by

occupation, 42 were ranchers and farmers. Actinomycosis, known as lumpy jaw in cattle, caused by the *Actinomyces bovis*, is occasionally transmitted to herders and dairy men and cattle men.

In California, coccidioidal granuloma, due to the *Coccidioides immitis*, closely resembling blastomyces, is a disease found primarily among farmers who contracted the infection in the course of their occupational duties. Tularemia is more common in rural districts, especially among farmers coming in contact with rabbits and the vectors that carry the infection. Tularemia must, therefore, be classified as an occupational disease.

R. T. Legge in 1921 investigated the abrasive action of figs on the cuticle of the operators picking and packing. The dermatitis of the fingers is undoubtedly due to the latex in the stems and skin of the fruit which possesses an enzyme having a proteolytic action on the skin.

Investigations by K. Meyer of the Hooper Foundation, University of California, San Francisco, in a botulism outbreak, revealed the fact that many cases of this disease were found among rural inhabitants who had eaten home-packed vegetables.

A form of eczema is observed among truck gardeners during the picking season of ripe tomatoes; it is also found in more pronounced form among peelers of tomatoes in canneries. It is believed that the irritating factor is the citric acid in the fruit, and can be relieved by dipping the hands in a mild alkaline solution.

During the past spring, when the daffodils were blooming, a farmer in San Mateo County complained of his pickers and packers having a dermatitis venenata, a rash with papules, vesicles, and at times pustules, due to an irritant probably in the sap of the flower stalks.

OCCUPATIONAL DISEASE AS A RESULT OF INSECTICIDES AND CHEMICAL POISONS

The horticulturist today, to secure good crops, is constantly waging war on enemies which bring disease and death to his trees, vines, and other forms of plant life. The various scales, mildew and fungus diseases, the bacteria, the destructive pests, such as flying and crawling insects, rodents and birds, require his utmost vigilance.

Among cattlemen in the Rocky Mountain states, Rocky Mountain spotted fever is quite common. The disease is transmitted by the *Dermacentor andersoni* (tick). The Supreme Court of Idaho, in 1932, upheld the Industrial Accident Board in its decision to grant an award to the beneficiaries of a man, who in the course of his employment was bitten by an infected tick and subsequently died.

Foot and mouth disease, or aphthous fever, a contagious disease found among pigs, cattle, sheep, and goats, due to an ultra-microscopic organism, is contracted by man, especially workers engaged in animal husbandry and dairy work. The commonest disease among milkers, dairymen and cattle raisers is undulant fever, found principally in dairy cattle, goats, and hogs. True Malta fever is due to the organism *Brucella melitensis*, and a similar disease in cattle and hogs to *Brucella abortus*. It has a mortality of 2 to 13 per cent. The only cases I have treated were among workers on dairy farms.

OCCUPATIONAL DISEASES AMONG FRUIT HANDLERS

H. Sutherland-Campbell brought to the attention of the profession the fact that parochia among orange workers is due to a fungus of the family Murovaceae. Workers are especially liable whose fingers come in contact with the pulp or juice of the orange, particularly that of culls.

L. B. Kingery and C. H. Thienes in 1925 found among fruit canners in the Pacific Northwest, a paronchia and dermatitis of the hands due to a mycelial infection. This disease has been called by the workers "fruit poisoning."

Poultry are infected with lice, sheep and livestock with mange and other parasitical infections. Creosol in some form is used as dips. Sheep dip, which is an arsenite of soda containing arsenic sulphide and free arsenious acid produces a characteristic rash on the exposed parts of the sheepman's body. Cases of perforations of the septum due to this irritant have been reported.

There are sprays intended for the destruction of chewing and boring insects and their larvae which contain principally arsenate of lead and Paris green. Kerosene and whale oil soap are used for insects that are destroyed by choking their respiratory apparatus. The scales and fungus diseases are checked by carbonate of copper, Bordeaux mixture, and nicotine. The fumigants are the deadly cyanide gas and sulphur. Occasionally a worker is accidentally poisoned, as was the case recently when cyanide fumigation was being used against a vine leaf pest in California.

In using arsenate of lead for effective spraying, there is the dual danger of either lead or arsenic poisoning. I recently observed the case of a horticulturist who had been spraying trees. Some of the spray had gotten on his face and hands, producing a typical arsenical dermatitis. Many workers develop scleroderma or warts during the spraying season.

Paris green is an arsenate of copper and is used extensively for spraying fruit trees, vines, and vegetables. It is responsible for producing typical arsenical symptoms, and causing skin irritation. Recently a case of amblyopia was reported in a young farmer who

was using nicotine in a spray for fruit pests.

Of the rodenticides, phosphorus, thallium sulphate, carbon bisulphide, and carbon monoxide gas are used. The records show many cases of poisoning and some deaths from the use of these toxic substances.

Several of the chemical agents used as weed killers produce dermatitis and are poisonous.

PREVENTIVE MEASURES

When consulting the Agricultural Index, one cannot help being impressed with the amount of research published annually on the various phases of agricultural activity and economics; dairying, animal husbandry, veterinary science, agronomy, and horticulture. However, virtually nothing is to be found pertaining to the farmer himself, his safety, and the prevention of his occupational diseases. The purpose of this paper is to point out the occupational hazards the agriculturist encounters daily, and their prevention by accepted methods. Every state board of health, workmen's compensation commission, state and agricultural college, farm advisory board, etc., should use its offices and bulletins to spread information concerning the methods by which the occupational hazards of the agriculturist may be decreased.

The man who knows the dangers he is likely to encounter, should study them just as the physician, who comes in contact with infectious diseases, is constantly on the alert to prevent them.

He should wear proper clothing, not only to protect his body from cold and heat, but proper boots to protect his feet from infection, gloves to protect his hands from chemicals and other agents that may produce dermatitis, and insulated hats to protect himself from heat stroke.

The various insecticides and rodenticides contain lead, arsenic, and nicotine, principally—all deadly poisons; and every one handling such agents must be warned of the effects they have on the human body. He should not only know the dangers, but the common antidotes and, in case of accident, what to do before the doctor arrives.

The sanitation of the farm is an important problem in rural public health procedure. It includes the control of malaria by established methods of mosquito control, of dysentery and diarrhea by preventing fly breeding through agencies to collect materials such as barnyard manure, garbage, and human wastes. Toilets with septic tanks avoid soil pollution from human wastes, and thus control hookworm. The prevention of accidents is accomplished by safety measures.

I have pointed out the occupational hazards of the agricultural industry and have presented the dangers that arise from accidents, diseases from farm animals and plant life and the hazards of chemical and physical agents used in agricultural pursuits. These hazards can be reduced fully two-thirds by the application of the measures used successfully by urban industrial concerns.

A School Health Program as an Educational Activity*

DON W. GUDAKUNST, M.D., F.A.P.H.A. (*Life Member*)

Director School Health Service, Department of Health, Detroit, Mich.

DUE to the complexity of modern social existence there is an obligation placed upon the educational forces of the community to direct those factors that determine the limits of health of individuals. These forces must be studied not from the viewpoint of a school alone, but as a community problem, when attempting to alter the practices of a group. The social forces of the community should be utilized. More specifically, this can be stated by saying that the improvement of health of the school child must bring into play alteration in the home and utilization of the facilities of the physicians of the community.

At its inception the school health program started with environmental factors. The program had utilitarian aims entirely. Sanitation, ventilation, and fire hazards were the first problems to be considered. Then was added the attempt to control communicable diseases. This was a little more complex, involving problems of an individual nature as well as those of environment and sanitation. As the work of health in our school systems become more extensive, more and more of the personal elements were given greater consideration. Individual resistance to disease was considered—the presence of defects of structure or development in children was

considered. Personal hygiene—eating, bathing, sleeping, waste elimination—all came to be considered as within the scope of a school health program.

This was as it should be, for with the advance of and the change in civilization and the mode of living, these personal problems became more important, not only to the individual but also to the community. Physical defects of children had to be corrected; individual resistance to disease had to be raised; a healthy efficient body structure had to be promoted.

The success of the health program in respect to improvement of the school plant and its environment was great. The technics used in bringing about these changes were successful. The school board appropriated money to make the improvements. The board of education supervised and demanded the alteration of old plants and the proper construction of new ones. Then, with the inclusion of newer items in the health program, the technic which had been so successful in the reduction of hazards, due to the faulty environmental factors, were very largely carried over. These technics of purchasing, demanding adherence to accepted specifications, alteration of existing faults by expenditure of public funds, were applied to the problems of purely personal health. The correction of visual defects, diseased teeth and tonsils, the immunization against certain diseases, the installation of bathing facilities, the establishment

* Read at a Joint Session of Public Health Education and Child Hygiene Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

of school lunches, all were undertaken in a very extensive manner on a purchase basis.

There has been widespread realization of the inadequacy of this plan of trying to purchase personal health. Few, if any, of the old problems were completely solved. The buying of health for school children served merely as a stop gap. New methods of approach have been developed. These are educational in nature and involve exceedingly simple principles. First, there is the development of a realization as to what constitutes good health; second, of showing people how to use their own initiative and existing agencies so as to secure this good health. Something must be substituted for the attempt to improve personal health by purchasing it for the individual child. The objectives and technic of health education need to be altered.

The first objective of any constructive school health program should be teaching the pupils and the community what constitutes good health. Next, there should be held as an objective of health education the development of an appreciation of what constitutes proper health advice. In this day and age of uncontrolled advertising of false and even dangerous medical claims, the exercise of great care and judgment is required to select the true from the false. It may be more important, for the social well-being of a school child, for him to know that diabetes can only be controlled by the skilled care of a physician, and cannot be helped by some advertised nostrum, than it is for that person to know that the capital of Michigan is Lansing and not Detroit. This change in health education is accomplished only with difficulty among certain people. It has been such a short time since all medical care was a court of last appeal—the doctor was called in only when all else had failed. The educational forces of this country have not

as yet taught people what constitutes proper health advice.

Another objective to be gained through the medium of health education in the schools is the establishment of a self-reliance in respect to securing health aid. The individual must be made familiar with and know how to make the most of the various remedial and prophylactic health forces of the community. It is not sufficient that the child have a physical defect removed or corrected by the school authorities. This is not education. This is repair, frequently instituted for the benefit of the school and not the child. That child must not be taught to lean upon the school nurse, physician, dentist, or nutritionist for health counsel, supervision, and treatment. It is the responsibility of the family to see to it that the child is placed in the best possible physical condition, not only so that he can secure the maximum from school, but also so that he can secure the most from all of life's experiences. By teaching the child and his family to rely completely upon the school health service staff for such things as physical examination, immunization, correction of dental defects, correction of any or all other physical ailments, that child and that family have been taught to rely upon a force that in but a very few years will be denied them. In this country no person can expect such medical and expert health care from the State after leaving school. The child and his family should be taught not only the need for medical care, but next they must be taught where and how to secure such care from the existing forces of the community. Without this latter part there will be no carry-over force to the teaching of the first part. The giving of this care by the school does nothing toward establishing a knowledge of the method of securing proper medical care. It does not educate and train a child to be a self-reliant citizen.

It tends to cause him to lean upon a force that suddenly is withdrawn when his school days are ended.

No satisfactory system has as yet been worked out in any country whereby the State can assume the responsibility in its entirety for the health practices and care of the people of that country. A division of authority must be made, separating those things which are the obligations of the State and those which are the obligations of the individual. The line of demarcation must be sharp, although from time to time changing circumstances must alter the location of the dividing line separating the one from the other. The school and educational systems, as the agents of the State, should see to it that those things over which the individual can, by the very nature of things, have no control are adequately supervised. There is that group of things over which the State has only part control and the individual has part. There must not be usurpation of authority by either the State or the individual in this category of activities. Then, there are those medical problems that are entirely individual and personal. It is but the duty of the school to educate the child in this respect and not actually to practise medicine.

The minimal staff to carry on the needs of the school system in respect to its physical health program must consist of persons trained in various lines. First, there is the physician with his agent, the nurse. Then, there is the teacher. The teacher is the most important of all in actually conducting the program. It is her duty to translate to the children and the community the principles of health as laid down by the school physician.

In considering the duties of the teacher we should rather think of the opportunities. Teaching of health is not and cannot be the rôle of any one person. No one teacher can conduct a course in health and feel that this is

all that there is to the problem. Health teaching must be integrated with all possible phases of school and community activity. In our schools it must be woven throughout the entire fabric of the plan of education. Every teacher must play a part. The first thing that should be done is to acquaint each teacher with each child under her supervision. Each teacher should know the limitations and potentialities of each of her children. She must be intimately acquainted with their physical defects. She may acquire this information in several ways—through being informed of them by the nurse; through watching a physician make the health examination; or, what seems the most satisfactory, through actually inspecting each child herself. The experience gained and the appreciation of the individual child's problems are so much greater if the teacher actually discovers them herself. The more the teacher recognizes these things in individual children, the more will health work become a living, vital force in moulding her method of handling the individual child. So, too, the more the teacher knows about these things, and the more she is able to do in taking part in a general health program, the more she can do to secure and further the correction of the existing physical defects of the group. If a teacher inspects the mouths of 100 children and finds that 75 or more of them are badly in need of dental care, there must be forced upon her a realization of the inadequacy of the existing dental program of the community.

It is not the duty of the teacher to diagnose and prescribe for physical defects. All she can do is teach the child and the community what constitutes good health and the method for securing improvement. In this she should be aided by the physician of the school.

It is not the duty of the school physician to diagnose and treat these same physical defects, for his rôle while in

the school must be one of education along the lines for which his special training best fits him. It is his duty to point out the way to correct and prevent. Frequently this is a much harder task than it would be to correct the fault, but he must at all times remember that he is but a part of the educational program dealing with the teaching of an entire community in the methods of appreciating, securing, and holding good health.

Treatment of the existing pathological condition is essential, but treatment in itself is not striking at the root of the evil. No child comes to school with a fault of physical structure or of health practice because that child wishes to have such a defect. It is present because there is a more fundamental fault. The parents and family are ignorant of one or more of several things. First, they may not know of the presence of or the significance of the defect. This is in itself of serious implication. It means that this family is lacking in the first fundamental of health education—they do not know what constitutes good health.

If the family is aware of the defect and still does nothing about it, once more the trouble is a correctable deficiency on the part of the family. They do not know how to secure the indicated medical or dental attention, the importance of such care, or how to utilize the existing corrective health forces of the community. Poverty is seldom, if ever, a valid excuse. In most communities there are welfare and relief agencies ready and willing to give care to those who are unable to secure it through other channels. If there are no such agencies operating, then again there is a fault of education of the community that is of far greater import than the mere presence of the uncorrected physical defects in school children. Here is opportunity for the school health workers to line up the existing forces

and agencies of the community to organize such corrective and treatment clinics as the welfare of that community demands. Affording treatment to the school child within the schools or by the school agencies, under such circumstances, is an extremely short-sighted public health policy, ignoring the needs of the other four-fifths of the community's population.

In following out a policy of education of the parents and the community both to provide and seek remedial treatment, the school health forces are working on a far-sighted plan. There is a carry-over value in this plan. If a mother is taught the importance of disease and is provided with both the incentive and the means of securing a correction for one school child it is not too much to hope that same parent will afford the same care for the younger children of the family; nor is it too much to expect that other parents will likewise learn how to secure medical aid for their children. The oncoming children will enter school in just that much better condition.

The ultimate in good care for children can come from having all the medical forces of a community utilized to their fullest in correcting and preventing defects of the children. The family and the child should be taught to go to a physician not only for correction and treatment of existing conditions, but they should be so guided that they will go to them for the periodic examination. The resources of the school should be reserved for the detection of defects in the children of parents who have not as yet learned to follow this practice. The child who is under the constant supervision of a private physician is not in need of examination and diagnosis by the school teacher, nurse, or physician, providing, of course, that there has been developed a satisfactory system of notification of the school of the uncorrected defects that

are apt to interfere with or call for a modification in the school curriculum.

The school physician should see to it that the medical forces of the community are organized and prepared to care for this assignment. The private physicians should be able to examine in a satisfactory and complete manner all children who present themselves. This service should be available at a price within the means of every family. It is not implied that a low or no fee should be charged, but it is essential that different arrangements be made to care for the different economic groups. Care should be consistent with and of a type that is available to that group at all times. There is no sense in sending the chronic pauper to the offices of the exclusive specialist for an examination if his family cannot call upon that same specialist for its medical care at all times. Attempting to do this causes unrest and dissatisfaction on the part of the patient and the physician. An arrangement must be worked out that will serve all members of that family at all times. The completion of such arrangements must, if need be, be carried out by the school physician and his staff. It is serving the school child to the greatest extent to see to it that medical care and attention are at all times available for all members of the school child's family. Picking out one or more members of that family for 9 or 10 months of the year for a few years of life is a most short-sighted policy. Let the schools educate the people as to the needs of medical care and the means of securing it; let them elicit and develop a sense of responsibility for health on the part of the family; let them prepare the medical profession to assume its obligation; and then most of the problems of school health will be solved in a permanent manner.

One of the greatest aids in securing the assistance of the group of practising

physicians of the community is to acquaint each physician with the school, its plant, teachers, curriculum, and aims. A concerted effort is necessary to accomplish this. Every physician of the community should be acquainted with these things, and it would be far better if every physician were allowed to take an active part in the health service of the school system. This participation should, of course, be under the instruction and guidance of the specially trained school physician. Just as it works to the advantage of the school child's health to have the teacher play an ever increasing rôle in the detection of defects and in the education of parents in the need for correction, so, too, does it act beneficially to have the practising physicians of the community play a similar part. They should become acquainted with the school child, his physical health problems, and the facilities of the school to care for and meet these problems.

The school health service caring for the control of communicable diseases is identical in its set-up with that for the control and correction of physical defects. Again, the teacher, nurse, and doctor must all play their parts. No one can do his share without the full coöperation of the others. Again, the educational factor is of the greatest importance. The program starts with the teacher and her activities. The teacher inspection of children is the start. But this inspection as a formal, comprehensive, searching program must be carried on in the home and not in the school. The teacher inspection should serve as a check on that of the parents. It should be a device detecting the failures on the part of the parents. Parents should not be taught to send their children to school in order to find out what is wrong with them, nor should parents be taught to assume that the school will take the responsibility of picking out those with communicable

diseases. If a child with a communicable disease is sent to school there is bound to be exposure of others. Parents must be taught how to detect signs of illness. When a parent fails in his duty and responsibility, a duty to his own child and a responsibility to the entire community, then the teacher should be in a position to detect this failure at once. This means that the teacher too has to conduct a second inspection. Having detected a child ill with symptoms of a communicable disease, but part of the task is done. The fault that lies back of this child's coming to school, endangering his own and the health of others, must be corrected. That can be done only in the home. That child should be taken home by the nurse and a full explanation given to the parents of what has happened and the danger resulting. The nurse because of her special training in this respect is in a position to instruct the mother as to the signs and symptoms of communicable diseases.

Immunization against smallpox and diphtheria, and at times and in certain localities against scarlet fever and typhoid, should have the same underlying philosophy as the routine program for the control of communicable disease. The vaccination of a child, the injection of toxoid, and other prophylactic medical practices, are not

primary functions of a board of education. They have little or no educational implication in themselves. As all too frequently conducted, they tend to tear down the laboriously built up teaching of self reliance. When diphtheria immunization is done in school and as a school project it should be conducted as a supplement to a general community health program, and every child that has to be immunized in school should be looked upon as a failure in the general health education program. Steps should then be taken to correct and lessen these failures. This same thought should apply to all other prophylactic practices that are carried on within the confines of the school.

A school health program conducted as an isolated bit of effort is doomed to failure. A successful school health program must be built around the full life of the school child. It must have as active participants not only the school doctor, nurse, and teacher, but also the parents, the physicians of the community, the social and welfare agencies, and all other forces that can influence the physical well-being of the entire community. The pupils should have a series of experiences of real learning, situations which can give them and their families an opportunity to plan their own solutions for the present and future problems.

Application of the Neufeld Reaction to the Identification of Types of Pneumococci*

With the Use of Antisera for Thirty-Two Types

GEORGIA M. COOPER AND ANNABEL W. WALTER

Bureau of Laboratories, Department of Health, New York, N. Y.

AS clinical results show that success in the treatment of pneumococcic pneumonia cases with specific antisera is dependent to a large degree on the early administration of the serum, the rapid identification of the infecting organism by a reliable method is of great importance. Neufeld¹ in 1902 reported that the capsules of pneumococci in contact with specific antiserum become swollen and more distinct in outline and develop a ground-glass appearance. In 1931, Neufeld and Etinger-Tulczynska² identified types of pneumococci in mixed cultures by this reaction and stated that antisera prepared in rabbits rather than in horses should be used. Armstrong,³ and Logan and Smeall⁴ in 1932, independently, reported that the reaction could be applied practically to the determination of the type of pneumococcus directly in sputum. Etinger-Tulczynska,⁵ in 1933, in a detailed study of the reaction, noted that antisera produced in rabbits caused the formation of broader, more strongly refractive layers around the cocci than the antisera produced in horses. The precipi-

tates formed by mixtures of pneumococcic soluble specific substance with horse and with rabbit antiserum differed when examined microscopically; that with horse antiserum appeared as granular heaps and that with rabbit antiserum as glistening drops and flakes.

Sabin (1933)⁶ made a practical application of the Neufeld reaction to the diagnosis of 100 cases of lobar pneumonia. With Type I and Type II antisera (rabbit) he was able to identify Type I or Type II in 53 cases and obtained no reaction in 47 cases which were subsequently shown to be caused by other types.

Beckler and MacLeod (1934)⁷ have examined 760 specimens using antisera for Types I to XXXII with an error estimated to be not over 1 to 2 per cent.

Notwithstanding the reports of others that horse antiserum was unsatisfactory, we made a trial of refined antisera which had been prepared from high grade horse antisera by concentration to one-tenth its former volume. The layers produced about the cocci were as broad as, or broader than, those formed in rabbit antisera. However, with both concentrated and unconcentrated horse antisera, the swollen capsules were less refractive than those formed in rabbit

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

antiserum. Furthermore, the antisera produced in horses generally gave considerable cross-reactions and consequently were unreliable. We find in many cases the characteristic appearance of the capsule in contact with its specific rabbit antiserum more dependable than mere increase in the size of the capsule.

Antisera produced in rabbits, with a very few exceptions, were highly specific when precautions were observed to avoid the injection of any considerable amount of autolysate and of any trace of soluble specific substance of other types.

The method of producing antisera as developed and carried out by Miss Rosenstein in this laboratory is given here in full because of the many requests which we have had for details.

Pneumococci are transplanted from stock cultures in beef heart phosphate (0.2%) broth containing 3 per cent citrated horse blood into tubes containing beef heart phosphate broth without blood and are incubated about 24 hours. From these preliminary cultures, transplants are made into bottles of beef heart phosphate broth for the antigens to be used for injection.

These cultures are incubated 18 hours. They are then centrifugalized and the sediment taken up in a solution of 0.5 per cent formalin in salt solution in such an amount that the sediment from 10 c.c. of culture is contained in 1 c.c. of suspension. The vaccine is held at room temperature for 4 to 5 hours to aid in killing the organisms, and then is stored in the icebox until used. Sufficient vaccine for the series of injections is prepared at one time.

Injections of rabbits are given intravenously on 3 consecutive days followed by 4 days of rest. A normal bleeding is made immediately before the first injection. The quantities injected the 1st week are: sediment from $2\frac{1}{2}$ c.c. culture (0.25 c.c. vaccine), sediment from 5 c.c. culture (0.5 c.c. vaccine), and sediment from 10 c.c. culture (1 c.c. vaccine). Beginning with the 2nd week, the sediment from 10 c.c. (1 c.c. vaccine) is injected each time.

When it seems advisable, trial bleedings are made on the 3rd day after the last day of the injection series in order that the schedule may not be interrupted if the titer of the

serum proves too low. The first trial bleeding is made after the fourth series of injections (the twelfth injection).

The minimum titer requirement which we have adopted for a serum is that it shall strongly agglutinate the strain with which it was prepared in a dilution at least of 1-200.

Agglutination titrations are carried out with equal parts of serum dilutions and formalized antigen or 18 hour live cultures diluted to make thin suspensions of approximately uniform opacity, which are mixed and are incubated 2 hours at 55° C. The agglutination reactions are read. Tests are placed in icebox overnight and again read.

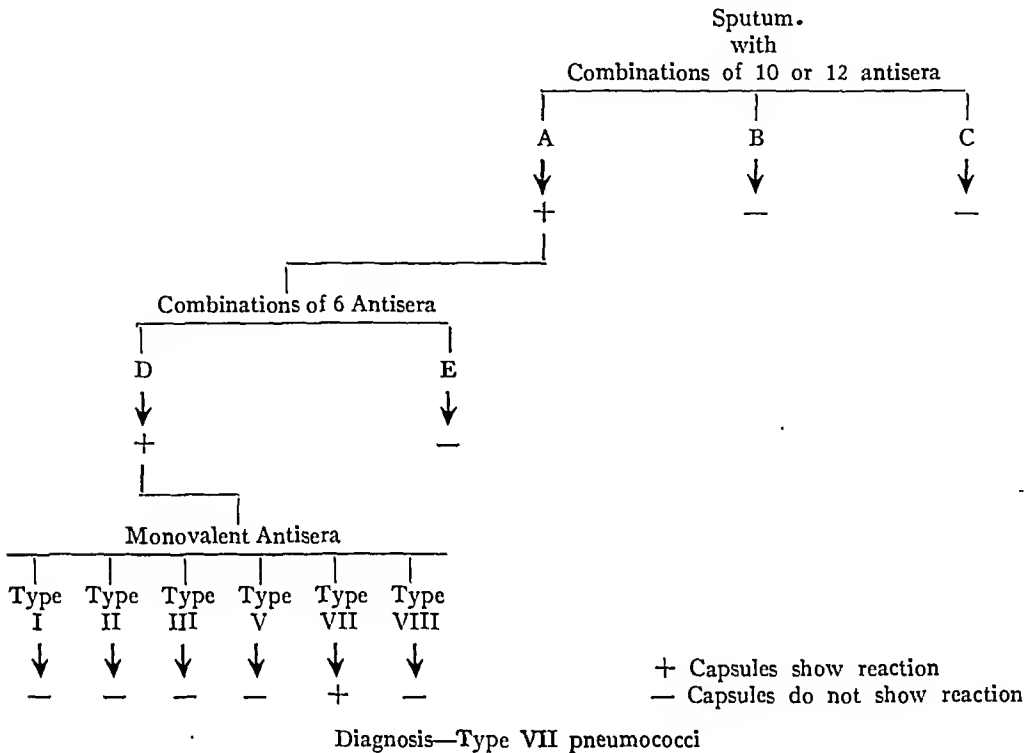
Rabbits are bled on the 6th to 10th day after the last injection.

Each antiserum is tested to determine its ability to cause a characteristic swelling of pneumococci of the homologous type and its freedom from cross-reactions.

Very bad cross-reactions result from the indiscriminate use of syringes. It is important, therefore, to reserve a separate syringe for each type for the period of immunization. Before a syringe is used for injections of another type it should be thoroughly scoured and cleaned. Through a failure of one of our workers to appreciate the importance of special care, a number of antisera were made, in the preparation of which syringes which had not been specially treated to remove all traces of the vaccines previously injected were interchanged from day to day. The syringes were rinsed by drawing water in and out and were sterilized. The antisera prepared at this time reacted so strongly upon the heterologous type strains which were being used for injection at the same time that in one or two instances the type for which the antiserum was prepared could be determined only from the records. A similar experience with like results was related to us as having occurred in another laboratory. It seems probable that some of the failures to secure reciprocally specific antisera for Types I and II from rabbits which have been reported to us may be explained in this way. It appears that a very small amount of antigenic sub-

TABLE I

EXAMPLE OF AN APPLICATION OF THE NEUFELD REACTION TO THE IDENTIFICATION OF THE TYPE OF PNEUMOCOCCUS IN SPUTUM WITH THE USE OF COMBINATIONS OF ANTISERA



stance may stimulate the production of antibodies sufficiently to cause marked reactions.

Some difficulty was encountered in the production of Type III antisera which would be free of reaction on Type VIII strains. Certain Type III strains are especially active in stimulating the production of such cross-reacting sera. The old Type III "R3" stock strain which we use seems to be more than ordinarily free from this quality. Where immunization was continued longer than usual, even with this strain some of the antisera produced reacted somewhat on Type VIII strains. Highly specific antisera can be prepared and only such should be employed.

Representative strains of Types I to XXXII were found to react in a satisfactory manner with their homologous antisera.

With a view to decreasing the labor involved in the use of so many monovalent antisera in separate tests, combinations of 5 or 6, or of 10 or 12 different antisera were tried. At first, we tried the combinations in amounts similar to the monovalent antisera and obtained a fair percentage of positive results, but failed to identify the type in several sputa which were loaded with pneumococci. These sputa were subsequently found to give very definite reactions with homologous monovalent antisera. When relatively larger quantities of the combinations were then tried with these sputa, it was found that the greater the proportion of serum, the more marked were the reactions. It is probable that when large amounts of soluble specific substance from disintegrated pneumococci are in the sputum, antibodies are neutralized so that where only relatively

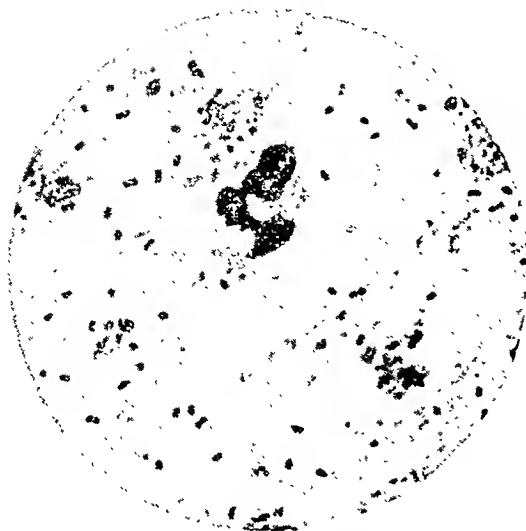


CHART I—Pneumococci with normal capsules.
No reaction.

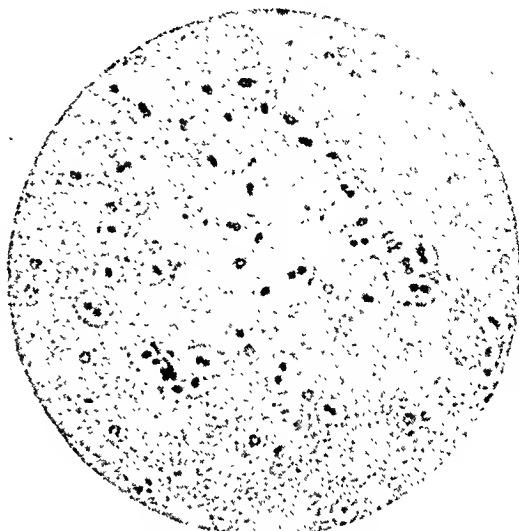


CHART II—Pneumococci with capsules swollen.
Positive reaction.

small amounts are present, insufficient antibody remains to cause a recognizable reaction with the individual organisms. With monovalent antisera a proportion of about 4 parts antiserum to 1 part of sputum, or other pathological material, generally gave satisfactory results; with combinations of sera, however, to obtain equally satisfactory results, a relatively greater amount, about in proportion to the number of antisera combined, *i.e.*, 20 to 40 times as much serum as sputum, was necessary. Satisfactory results can be obtained with pneumococci in cultures and in peritoneal washings of mice if a sufficiently large proportion of antiserum is employed.

Although, without question, where serum therapy is to be used, the examination for the type should be made at the earliest possible moment, the contention that "sputum should be typed not later than 2 hours after it is coughed up," is not valid. We found that the type could be determined in a majority of sputa considerably older than this. Specimens after storage in the icebox for over 2 weeks gave positive results.

Sputa kept at room temperature gave unsatisfactory results because of the overgrowth of other organisms.

The results⁸ reported at a meeting of the Society of American Bacteriologists in December, 1933, of the examination of a group of unselected sputa from 110 patients made 6 to 48 hours after collection illustrate the degree of success that is possible with such material. Positive findings were made in 84, *i.e.*, 76 per cent, and negative findings in 28 cases, 24 per cent. Of the latter, 6 were from respiratory conditions other than pneumonia. Of the 22 negative sputa from lobar pneumonia cases 7 were from patients 1 to 8 days after the crisis, and 5 had received serum treatment which may have influenced the results. No explanation for the negative findings in the other 10 is available, as the examinations were not repeated since they had been made, not with the object of making a diagnosis, but as a means of investigating the activity of certain sera.

We have found the following technic for carrying out the test satisfactory:

With a tiny loop or a straight wire place

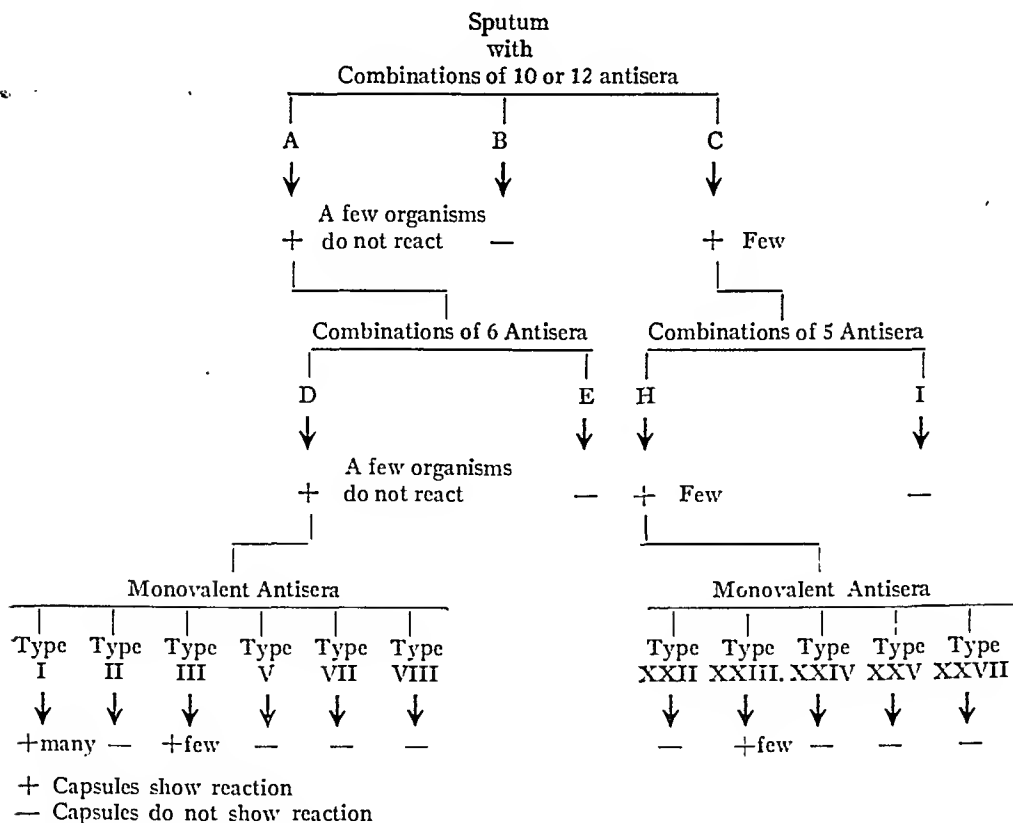
a very small amount of material on a cover glass, mix with 4 to 40 times the amount of serum as required and a standard loopful (0.01 c.c.) of Loeffler's methylene blue. Seal on a hollow-ground slide with cedar oil, place a drop of oil on the cover glass and examine with the oil immersion lens. Inverting the slides with the ends on side rests, and cover glasses down for a short time before examination seems to facilitate the examination, especially when the specimen is thin. The heavier elements, including the pneumococci, settle on the cover glass and may be more easily examined. A fairly good microscope is necessary and a powerful microscope light is a great aid. When only ordinary light is

available the drops may be placed on flat slides and covered with cover glasses. When the organisms are few they are somewhat more difficult to find in thin preparations.

The procedure is to observe the reactions with 3 combinations of 10 to 12 antisera among which Types I to XXXII are divided. If there is a reaction in one of the combinations, tests are carried out with 2 combinations each containing 5 or 6 of the antisera included in the combination with which the reaction was obtained. Finally tests are made with the individual mem-

TABLE II

EXAMPLE OF AN APPLICATION OF THE NEUFELD REACTION TO THE IDENTIFICATION OF THE TYPES OF PNEUMOCOCCI IN SPUTUM WHEN MORE THAN ONE TYPE IS PRESENT WITH THE USE OF COMBINATIONS OF ANTISERA



Diagnosis—Type I predominates. Types III and XXIII found in small numbers. Infecting agent probably Type I. It may be a mixed infection but the common occurrence of Types III and XXIII in the mouths of normal individuals makes this conclusion doubtful without further proof.

bers of the combination or combinations with which reactions were obtained. By this procedure, the type of pneumococcus, or if more than one type is present, the types of pneumococci, may be identified. If it is probable that only one type of pneumococcus is present, as for example in a spinal fluid from a case of pneumococcic meningitis, when a reaction has been obtained, examinations of other combinations or antisera may be omitted. This procedure may also be followed in the examination of sputa from pneumonia cases when all the pneumococcus-like organisms appear to react. We find that the examination of such specimens can be completed in less than an hour.

Type determination by the Neufeld reaction seems to be the most rapid and reliable method which has been devised. It has the advantage that it can be applied wherever suitable microscopic means are available, without other, more cumbersome, laboratory equipment. It has the further advantage that the approximate number of pneumococci present can be estimated, which is of some diagnostic and prognostic value. The identification of the organisms actually present in the sputum is more reliable than any method in which mice are employed, because, in mice, there is always danger that certain mouth pneumococci, which are more virulent for the mouse, may overgrow the infecting type of the case.

SUMMARY AND CONCLUSIONS

Capsules of pneumococci of Types I to XXXII are specifically reacted upon by homologous type specific antisera (rabbit).

Time and labor are lessened by making preliminary tests with combinations of the antisera.

Success with materials of different kinds containing pneumococci depends on making the tests with a relatively very small proportion of the material to a large proportion of the antiserum.

With care, suitable type specific antisera can be produced in rabbits.

Some lots of Type III antiserum notwithstanding special precautions in their preparation may react on type VIII pneumococci, therefore each lot should be tested for its specificity.

REFERENCES

1. Neufeld, F. Ueber die Agglutination der Pneumokokken und über die Theorien der Agglutination. *Ztschr. f. Hyg.*, 40:54-72, 1902.
2. Neufeld, F., and Etinger-Tulczynska, R. Nasale Pneumokokkeninfektionen und Pneumokokken Keimträger im Tierversuch. *Ztschr. f. Hyg.*, 112:492-526, 1931.
3. Armstrong, R. R. Immediate Pneumococcal Typing. *Brit. Med. Jour.*, 1:187-188, 1932.
4. Logan, W. R., and Smeall, J. T. A Direct Method of Typing Pneumococci. *Brit. M. J.*, 1:188-189, 1932.
4. Etinger-Tulczynska, R. Bakterienkapseln und "Quellungsreaktion." *Ztschr. f. Hyg.*, 114:769-787, 1933.
6. Sabin, Albert B. Immediate Pneumococcus Typing Directly from Sputum by the Neufeld Reaction. *J.A.M.A.*, 100:1584-1586, 1933.
7. Beckler, E., and MacLeod, P. The Neufeld Method of Pneumococcus Type Determination as Carried Out in a Public Health Laboratory: A Study of 760 Typings. *J. Clin. Investigation*, 13:901-907, 1934.
8. Unpublished.

Generalized Public Health Nursing Service in Cities*

NAOMI DEUTSCH, R.N., F.A.P.H.A.

*Assistant Professor of Public Health Nursing, University of California,
Berkeley, Calif.*

IN the recently published *Survey of Public Health Nursing* by the National Organization for Public Health Nursing, evaluation has been made of the performance of public health nurses based upon a sampling of services throughout the country. This searching probe of accomplishments and shortcomings gives substantiating evidence of present public health nursing practices and their effectiveness in meeting community needs. Certain conclusions are presented from a study of 39 agencies which may have a direct bearing on future plans for the public health nurses' part in a community program for the prevention and control of syphilis.

The survey's analysis of home visits included 7 types of services; marked difference in the quality of performance was revealed. The service designated as "Disease Prevention, including Syphilis and Gonorrhea Control" ranks fifth in the list. Only 13 out of the 39 agencies surveyed "render supervision to some extent," to cases of syphilis. As in other related services in the community, such as hospitals, laboratories, clinics, and social agencies, public health nursing facilities are also inadequate in dealing with this gigantic problem

with forcefulness and vigor. This is especially striking in view of the widespread prevalence of this disease and the knowledge possessed regarding its prevention, permanent arrest, and cure.

What are the difficulties in its control? How can the administration and practice of public health nursing services be made more effective with respect to this pressing public health problem? A clue to the answer to these questions may be found in this survey which indicates those factors in the performance of public health nursing which might be used as a foundation upon which to build and expand the public health nursing activities in a social hygiene program.

It is a noteworthy fact that the prenatal visit ranks first in the list according to quality of performance. This is of particular interest since the general conclusions of the survey state that the home visits in which health supervision and teaching form a major part rank lower than services in which bedside care is given. Yet the prenatal visit is primarily educational. The rôle of the nurse when making home visits for the control of syphilis is certainly that of teacher, yet these visits rank fifth. It is not difficult to find the reason for this apparent anomaly. Studies, demonstrations, and opportunity for research over a period of years have made available definite knowledge regarding the content and

* Read at a Joint Session of the American Social Hygiene Association and the Public Health Nursing Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1935.

method of the prenatal home visit. The Maternity Center Association has offered supervised field experience and has published briefs and outlines, both for use in the home visit and for group instruction. Other material from the Children's Bureau and from insurance companies has made possible the distribution of current and specific information regarding the procedures and technics in prenatal care, both in urban and remote rural areas. Supervisors with special maternity experience and training are more frequently a part of the supervisory staffs of public health nursing agencies than for other types of services.

A similar plan of study needs to be undertaken to gain more specific knowledge regarding the program and performance of the public health nurse in venereal disease services. It is obvious that education in the medical and nursing facts of syphilis is a necessary prerequisite for intelligent participation and for a high quality of performance. The *Survey of Public Health Nursing* states that only about 7 per cent of the nurses from whom information was obtained had completed an accredited curriculum in public health nursing. Thus, outlines and briefs (perhaps a summary of Gladys L. Crain's articles published in the *Public Health Nursing Magazine*) should be made available to assist the nurse in enlarging her content and improving her teaching. Statements covering the technic of the interview, the attitude and administration of the clinic need to be included. Opportunities for field practice under the direction of specialized supervisors, and theoretical instruction through extension courses would be of great practical aid in improving the quality of this service. Constant good teaching, in the home and in the clinic, not just "telling," will overcome many of the difficulties entailed in case finding and case holding activities.

A second factor brought out in the Survey showing possibilities for future development in this program, is provided by the criteria upon which ratings are based. Approach ranks first. The importance of this as an asset in communicable disease control cannot be overestimated. Many authorities state that the immediate problem is the prevention of the further spread of infection. To accomplish this the coöperation of the patient is essential—gained through an attitude of consideration in the clinic and an understanding of the social factors involved; through the nurse's tactful and skillful home visit influencing the patient and family to assume their share of the responsibility for the successful termination of the long period of treatment. The good approach is a big element in bringing this about. The Survey defines approach as: "implying those intangible qualities of relationship with people which makes for a good or poor contact." Upon the nurse's approach often depends the finding of sources of infection and contacts who must be persuaded to seek medical advice, early diagnosis and treatment if needed. Since "approach" was universally found to rank high and is of such importance in the work, it would seem that public health nurses can contribute effectively to community programs for controlling syphilis and assist in adjusting the social and economic conditions causing their spread.

C.-E. A. Winslow, in his book, *A City Set on a Hill*, in the chapter on Venereal Disease, says: "The most important development in the venereal clinic during the demonstration period has been in the employment of two nurses for social service follow-up of cases."

Given better qualified and more proficient personnel, current authoritative manuals of instruction, supervisors with special preparation, opportunity for continued staff education through insti-

tutes and study courses—all these though of primary importance are still only part of a plan for the development of more effective case finding and case holding activities. Equally important is the type of administration.

Public health nursing services require efficient administrative direction, including adequate financing and coördinated and unified community relationships. To achieve this, a generalized nursing program is most suitable, consisting of several types of nursing services administered by one agency, each nurse giving all these types of service to families under her care. Again quoting from the Survey:

Since the goal in public health nursing, as in many services essential to the well-being of the population as a whole, is a comprehensive community program, the Committee strongly recommends that all public health nursing be carried by as few agencies as possible. Through a combination of agencies, as is self-evident and as has already been demonstrated, a service of a more uniformly high quality can be rendered in a community with provision for a more effective program of supervision and staff education, with less expenditure of money than when there are many independent services. The Survey shows beyond a shadow of a doubt that such provision is one of the greatest needs of the present moment.

A generalized public health nursing service would be of great administrative advantage in the problems associated with case finding and case holding. In setting up a plan to meet this community need and make it most productive, the nursing agency must take part in coöperative study, through representation on the Community Social Hygiene Council, together with representatives of official and nonofficial agencies. In such a council, programs are studied and plans made so that contributions of the agencies and the professions may be most effective. These programs are based upon current information and knowledge of the extent and cost of venereal disease, upon

knowledge of activities of organizations directed against them, upon a record of facilities for their diagnosis, treatment, and after-care, and upon methods of "quacks" to trap the credulous. Such centralized direction, under leadership of the health department, facilitates coördination and integration of medical and nursing services and more nearly approximates the production of a maximum service with a minimum of waste.

Syphilis is essentially a problem of the whole family and the modern definition of public health nursing, whatever the program, is based on its relation to the individual as a part of the family and of the community.

The public health nurse is well known to many families in her district. Her maternity program includes the supervision of the pregnant woman. The possibilities of eradicating congenital syphilis through treatment early in pregnancy is a challenging problem in which the private physician, the clinic, and the nurse unite forces. Other types of home visits offer equal opportunity to change the attitude of the family toward syphilis, so that delinquent clinic patients, wrong addresses, fictitious names, will not be the rule, but instead a coöperative and responsible attitude on the part of the family, the attainment of which is so gratifying when working toward the prevention of other communicable diseases.

An example illustrative of such family coöperation occurred during the recent poliomyelitis epidemic. Two young girls had, after months of planning, arrived at a girls' camp. The day after they left home their mother ascertained that a child, with whom they had been to a party the evening previous to their departure, had developed poliomyelitis. She notified the clinic doctor and the camp director and the children were brought home and isolated.

Venereal disease, of course, presents more difficult problems, in many ways,

than other communicable diseases. It is more difficult to persuade people to the same reasonableness of attitude regarding diagnosis and treatment as has been developed toward tuberculosis. But a technic adequate for social and medical ends is being developed. The greater use of the generalized public health nursing agency by physicians and clinics as an economical and effective channel through which the weak spot—in

the control of syphilis, namely the finding and holding of cases—can be strengthened. The rôle of the adequately prepared and supervised public health nurse as the interpreter of scientific knowledge in performing family health service under the direction of a generalized public health nursing agency should be of great assistance toward attaining the goals of preventive medicine and public health.

Deficient Hospital Service

THIRTY-ONE million persons in the United States live in areas which are seriously deficient in hospital and health services according to a nationwide study made by Alden B. Mills, managing editor of *The Modern Hospital*, and formerly executive secretary of the Committee on the Costs of Medical Care.

About 1,300 of the 3,073 counties in the United States have no general hospitals. Some do not need general hospitals since they are or can be served by hospitals in adjacent counties if the distance is not greater than 50 miles. Consequently in this study the United States is divided into areas with approximately 50 miles radii.

After careful study of all factors involved it was decided that rural populations require a minimum of 2 hospital beds per 1,000 population, although the study does not recommend or consider practical the building of general hospitals of less than 25 beds. For smaller areas it is suggested that "cottage hospitals" or central medical service offices be established.

There are 31,000,000 people and 29,000 physicians in areas that contain less than 2 hospital beds per 1,000 population and are more than 50 miles from a hospital center; there are 1,117,915 persons and 896 physicians in areas that have less than one-fourth of this ratio (0.5 hospital beds per 1,000 population), that there are 147 such 100 mile areas in the United States which have fewer than 2 hospital beds per 1,000 population and that there is an actual need of 22,000 additional hospital beds in these 147 areas if minimum standards are to be met.

W. S. Rankin, M.D., F.A.P.H.A., of the Duke Endowment, says that the community without hospital facilities has ceased to attract the young, well prepared physician, and that, if he is forced to locate in such a rural area, he stays no longer than necessary to enable him to move to a community providing hospital facilities and congenial professional surroundings. Herein lies the principal cause of the relative scarcity of physicians in rural communities.—*The Modern Hospital*, Mar., 1935.

Formation of Sanitary Districts in Recreation Areas*

W. W. CHANDLER

Chief Sanitary Inspector, Orange County Health Department, Calif.

SANITATION, sewage disposal, and garbage disposal in recreation areas in California constitute a problem which is largely unsolved; yet, upon its proper solution rests the future and the safety of these areas.

Regulation and control have been left principally to the counties in which these recreation areas exist and in part to the Federal Forestry Service where the recreation areas lie within national forests.

County ordinances covering rural sewage disposal are not always applicable because they do not take into account the type of soil structure and drainage common to the recreation area. Sewage disposal facilities which would be safe and entirely adequate in one place may be a menace to health in an area where the soil is shale and gravel and the terrain is precipitous. Although chemical toilets are necessary in some locations, the owners find them inconvenient and expensive to maintain. In some selected locations we have found that contamination can be prevented by the construction of septic tanks of proper capacity, made of concrete, with the effluent passed through a sand filter. Such alternatives as this are seldom pro-

vided for in our rural sanitation regulations. Few if any of these general ordinances deal with garbage and waste disposal, the enforcement of safe building, plumbing, and wiring regulations to reduce the fire hazard.

After careful study, we have concluded that the interests of the areas will be best served by the formation of sanitary districts within these recreation areas. In our county, one of these districts is now in process of formation, and others are soon to follow. We feel that a local district can best deal with the sanitary problems of the area, as soil conditions and terrain differ from one recreation area to another.

Ordinances passed by the sanitary board have the force and effect of law. If the character of one area permits the use of a septic tank with sand filter, and that of another requires chemical toilets, such differences can be provided for by the respective boards.

In addition the sanitary board can, through housing, plumbing, and wiring ordinances, control the housing conditions and, to a marked degree, the safety of the area. With a sanitary district functioning, it will no longer be possible for ramshackle, unsafe, and disreputable looking houses to be built, depreciating the value of better properties beside them and increasing the fire hazard by unsafe and illegal wiring. The danger of such wiring was brought to our attention forcibly by the recent

* Read at a Joint Session of the California Association of Sanitarians and the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

disastrous fire in the Arroyo Seco above Pasadena.

A sanitary district can, at small expense, provide for the proper disposal of garbage and waste (cans, etc.) at regular intervals. Throughout California we have witnessed the progressive spoiling of our recreation areas with improperly disposed garbage, old cans, papers, etc. Add to this the danger to public health from the breeding of flies and mosquitoes in garbage and old cans. In addition, open and improperly disposed of garbage is a lure to rats, mice, and ground squirrels, serving to increase their numbers materially and attract them to the recreation areas. This, in turn, increases the possibility of outbreaks of bubonic plague and relapsing fever, which are already endemic in our rat and ground squirrel population.

A sanitary district can materially aid in the beautifying of its area by passing an ordinance requiring the coralling and fencing of all domestic animals which are now permitted to wander about, destroying flowers and plants. The saving in the cost of fencing properties alone would pay the cost of this for many years. Still another advantage of a sanitary district is that it would be legally organized to enter into contracts with the federal government for the development and maintenance of water

supplies and in this regard, would exercise the function of a water district with the additional functions of general sanitation, garbage and sewage disposal, and housing regulations.

And now for the cost—We feel that the disposal of garbage, cans, and trash can be taken care of very cheaply. The rate is low by virtue of the fact that in the neighborhood of most areas there is a man who owns a truck and will haul and dispose of the garbage and refuse for about \$50 a month or less. I feel certain that there are few districts which cannot find a responsible neighborhood rancher who will be glad to get the work.

The inspections are and will continue to be the function of the county health department.

SUMMARY

California has not developed an adequate technic to regulate sanitation, garbage, and waste disposal, building construction, plumbing, and wiring in the recreation areas of the state.

General rural sanitation regulations are largely inapplicable to recreation areas where unusual soil and topographical conditions exist.

The formation of sanitary districts in these areas appears to be the most practical, all-inclusive, low cost solution of the problem.

Public Health Degrees Granted in 1934

THE Committee on Professional Education of the A.P.H.A. has compiled a list of colleges and universities in the United States and Canada which grant degrees in public health. The March issue of the *Journal*

carried a report on the number of degrees granted in 1934, as well as a comparison of 1932, 1933, and 1934 figures. Reprints are available free, and may be had on request to the Executive Office.

The Vitamin B Adventure

R. R. WILLIAMS

*Department of Physiological Chemistry, Teachers College,
Columbia University, New York, N. Y.*

THE study of vitamin B which I have been privileged to pursue since 1910, has been preëminently a co-operative enterprise. Nearly 40 years of effort by scores of workers in many lands have furnished its foundation, and the early precedent of collaborative effort has been followed in our recent work.

The major task in defining the structure of the vitamin was getting enough vitamin for study. In this part of the work, much of which was done in The Chemical Engineering Laboratory through Dr. Jackson's kindness, the aid of Mr. Waterman and Dr. Kereszteszy was indispensable, not only because of their resourcefulness but because of their stamina under seemingly endless disappointments. Miss Ammerman's skill in guiding the work by means of curative tests on polyneuritic rats was equally important.

We have produced about 12 gm. of vitamin crystals, of which 4 or 5 gm. have been used for structure work. Vastly more material would have been required some years ago before Pregl's micro-analytical methods were developed. These were applied very successfully to our problem under the supervision of Dr. Oskar Wintersteiner of the Columbia Medical School, New York.

A disaster of earlier years was turned to account in approaching the study of structure, for sulphur dioxide which destroyed the vitamin where it was used as a preservative for rice polish extracts,

proved a tool for neatly splitting the vitamin molecule into two pieces without producing any chips. The reactivity of the sulphur in the vitamin led Dr. H. T. Clarke of the College of Physicians and Surgeons, who has specialized in the field of organic sulphur compounds, to suggest the presence of a thiazole ring, or nucleus in it. The absorption of ultra-violet light by one of the pieces of the vitamin, obtained by sulphur dioxide splitting, was found to resemble very closely that of a synthetic thiazole. A little further work served to confirm Dr. Clarke's suggestion. This is the first time a thiazole ring has been found in nature and it is not difficult to imagine that its discovery may ultimately prove more important to biochemistry than the structure of the vitamin itself.

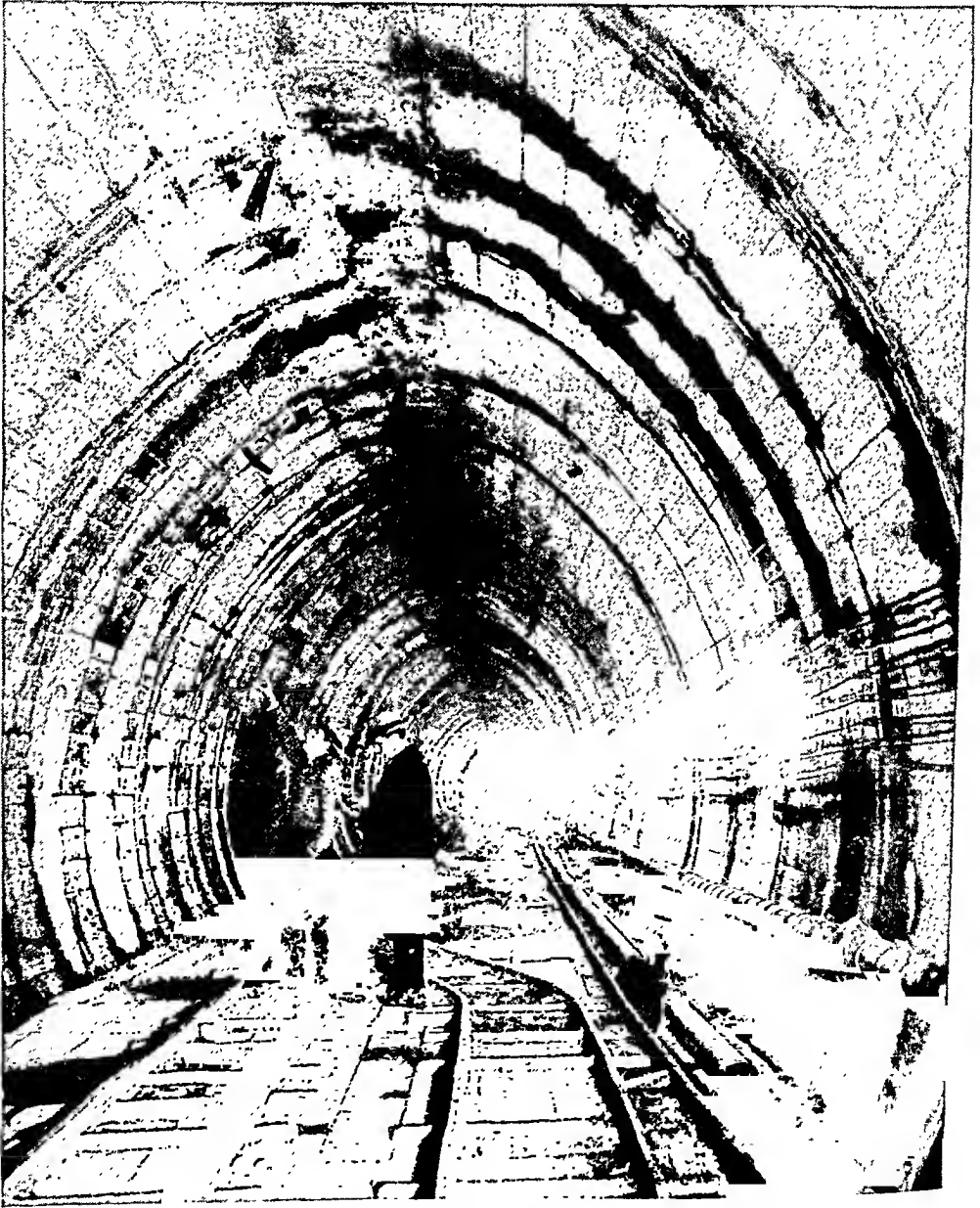
We have made unusual use of ultra-violet light absorption in this study, for the pyrimidine nucleus in the other piece of the vitamin was confirmed also by this means as applied by A. E. Ruehle of the Bell Laboratories.

In the meantime Dr. E. R. Buchman, working at Teachers College, New York, in Dr. Eddy's laboratory and Dr. Samuel Gurin had ascertained by classical organic methods the identity and location of the side chains which cling to the two nuclei. Dr. Buchman also applied the happy idea of a central pentavalent nitrogen atom through which the two nuclei are attached to one another. This was confirmed by potentiometric titrations by Mr. Ruehle

using a type of equipment developed for telephone corrosion studies.

Thus four distinct laboratories contributed personnel or facilities. If there had been need for other talents we should have sought them. Such is the coöperative principle in modern re-

search. Nor should we forget the Carnegie Corporation who very generously supplied funds, nor even the much maligned depression which afforded additional week-end leisure for the work to the Bell Laboratories' contingent.



This is not the interior of a cathedral, but a typical sewer tunnel under a Chicago business street. In some parts, the tunneling is more than 19 feet in diameter. This immense sewage disposal project, the largest of its kind in the world, is being financed with an allotment of \$42,000,000 from the Public Works Administration.

CLIMATIC AND OPERATIVE TREATMENT OF SPINAL TUBERCULOSIS*

EXCERPTED BY RICHARD A. BOLT, M.D., F.A.P.H.A.

Director, Cleveland Child Health Association, Cleveland, Ohio

IN a comprehensive paper on Climatic and Operative Treatment of Spinal Tuberculosis, Dr. Fred H. Albee † gives a summary of our knowledge of surgical tuberculosis.

"Although quite readily distinguishable from one another by cultural, morphological, and inoculation tests, the bovine and the human tubercle bacilli are undoubtedly of common origin. That the two organisms are both responsible for human tuberculosis has been demonstrated abundantly; although what percentage of infections is due to each is the subject of divergent opinions. Bacteriological investigations by reliable workers have demonstrated the relation of a large proportion of bovine infection to an infected milk supply and a young age incidence. This is a natural sequence of events. The chief article of diet at the age when osseous tuberculosis is most common is milk. If this staple food is contaminated by the bovine tubercle bacillus, its ingestion is very naturally followed by tuberculous disease of the lymphatic nodes, cervical and mesenteric, and from this focus, a distribution of the bacilli to the bones and joints readily follows.

"*Portals of Entry of the Bacilli*—Antenatal infection may be disregarded as an unlikely possibility. The two most accessible channels of inoculation are the respiratory and alimentary systems. The relative importance of the two is still under discussion but unquestionably varies with the time of life, the preponderance of surgical tuberculosis in children suggesting the probable ingestion source at that time, while in adults the process is reversed, pulmonary lesions becoming the commonest and suggesting the respiratory origin.

"Other less common means of entrance are

the tonsils, the pharynx, the skin (following wounds), the genitourinary passages and the teeth; in the pulp of carious teeth tubercle bacilli probably infect the submaxillary groups of lymph nodes.

"*Source of Infection of the Bones and Joints*—Direct infection of a bone or joint from without so rarely occurs as to be a negligible factor. The indirect avenues of invasion are of course the blood stream and the lymphatic system. Much important work has been done by investigators to determine whether one or both of these routes provided the path of infection and whether the bones and the joints were equally liable to invasion or stand in relation to one another as primary and secondary infections.

"From the mass of data accruing from these investigations, four conclusions may be drawn: (1) Experimental tuberculous lesions are difficult of production; (2) trauma is a relatively slight factor; (3) joints are much more susceptible to tuberculous infection than bones, and (4) the joints are infected through the medium of the blood stream.

"*Predisposition*—to the tuberculous condition may be exhibited by reason of (1) injury, (2) heredity, and (3) general causes.

"1. *Injury*—Although a history of previous injury is nearly always given, there is no doubt that in a certain number of cases traumatism is an important factor. The effect of injury may be felt in two ways: (a) by the production of a *locus minoris resistentiae* consequent upon a small effusion of blood and lymph in the cancellous tissue and a stagnation of the organism; and (b) where a preëxisting tuberculous lesion has been circumscribed, encapsulated and quiescent, trauma may provoke active spreading of the process and the production of an infiltrating tubercle; this, in the case of a tuberculous focus in or near the articular extremity of a bone, may cause extensive involvement of the neighboring joint. It is believed, however, that in the histories of tuberculous joint cases the frequent occurrence of trauma as a possible etiological factor is partly accounted

* Abstract of paper presented to the Midyear Conference of the International Society for Crippled Children, Tampa, Fla.

† Fred H. Albee, M.D., Sc.D., LL.D., New York City and Florida Medical Center, Venice, Fla.

for by the fact that emphasis is placed upon the injury because the joint was sensitive from the lesion already present.

"2. *Heredity*—The subject of direct heredity has aroused strong discussion, and although cases of apparently true congenital tuberculosis have been reported, it is believed that a tuberculous parent reacts upon its offspring in a less direct manner: (a) by actual transmission of the tuberculous virus to the subject during intra-uterine life (Baumgarten); (b) lowering of the vitality of the subject by reason of the impoverished state of the parent's blood; (c) a tuberculous parent stands as a constant source of infection by virtue of proximity to the child.

"3. *General Causes*—These all operate to lower the vitality of tissue and to render the soil fertile for the implantation and growth of the offending bacilli. Among the more important debilitating states are the exanthemata, influenza, inadequate feeding, and want of fresh air and sunshine.

"In the first place, it should be considered as a chronic lesion, with probable foci in other regions of the body, which may or may not precede it (the particular lesion under treatment).

"As a rule, conservative treatment takes priority over operative interference in osseous

tuberculosis (except in the case of tuberculous vertebrae where a bone-graft or fusing operation is indicated in every case) in contradistinction to the treatment of monarticular joint tuberculosis, in which condition the reverse is true, especially in children. Operative measures should, however, be undertaken before bone destruction, secondary infection with abscess and sinus formation have occurred, and when lardaceous disease is threatened, especially in adults.

"The marked curative effect of bony ankylosis upon any tuberculous joint is axiomatic in orthopedic surgery. Without ankylosis, an advanced tuberculous process in a joint can never be said to be cured. In planning treatment of tuberculous spines, it is therefore of extreme significance that, anatomically, we are dealing with joints under constant uncontrollable mechanical influences, such as respiration and involuntary muscle spasm. This fact contributes greatly to the spread of the tuberculous process, prevents cure and makes for the development of extensive deformity, known as hunch back. It not only makes it more difficult for nature to set up a protective ankylotic process, but also presents increasing difficulties to the surgeon who attempts to bring about immobilization by nonoperative conservative measures."

Compulsory Health Insurance in Germany

THE available evidence is overwhelming that the effect of compulsory health insurance on the German medical profession has been little short of disastrous. The literature on the question, mostly in the German language, is as impressive as it is often pathetic in its pessimism regarding the outlook for far-reaching reforms. As

has been well said in an article in *Science* of October 12, 1934: "The medical profession in Germany has fallen into disrepute." . . . and "If present conditions are allowed to continue much longer, medicine will sink into a bog of absolute inefficiency." —Frederick L. Hoffman, LL.D., *California & West. Med.*, Feb., 1935.

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HENRY H. KESSLER, M.D., Industrial Hygiene	KENNETH F. MAXCY, M.D., Dr.P.H., Epidemiology

SOCIAL SECURITY AND PUBLIC HEALTH

THE Federal Government's attempt to provide security against the major hazards of life is not a new idea. From the standpoint of health it has been one of the major objectives of the public health movement from its inception. Recent events have served to dramatize the whole topic of social security, by reason of large scale participation of the Federal Government in local economic and social activities. This participation has necessarily raised many difficult and fundamental questions of social policy and group relationships. The Association should be keenly alive to its responsibility for being certain that any proposed legislation or programs are in accord with sound public health policy. This does not mean the mere protection of the "rights" of the public health worker. It does mean the extension of adequate health service to all of the population without undue weight being given to interests of any special group of workers.

The scope of the pending social legislation before Congress merits careful analysis and constructive thinking. It holds out great promise for large scale financial assistance for local medical and public health programs. At the same time, it brings to focus several important controversial problems of policy and relationships.

The availability of federal funds for local health programs is now generally accepted as sound policy, though the question of the effects of central control is still raised in many quarters. There seems no sound reason why the federal relationship should not leave ample local autonomy, and at the same time assist in securing adequately trained health workers, proper local administration and programs.

The proposal to include medical care of certain groups in the public health program raises a definitely controversial subject. Among public health workers there are those who contend that the activities of the health department should be confined strictly to a program of prevention. They are convinced that the inclusion of the care of sickness will tend to obscure, if not submerge, preventive activities. It seems certain that no additions to the public health program should

deflect attention from our responsibility to provide adequately for control of communicable diseases, sanitation, infancy and maternity service, school hygiene programs, and public health education.

The proposals for health insurance are not primarily public health measures, but attempts to provide sickness care. We are definitely concerned with those aspects of this question which relate to possibility that public health departments will be concerned in their administration. This does not imply that the public health worker does not recognize the great importance of adequate sickness service as a measure for health preservation. As at present proposed, sickness insurance is not a primary responsibility of the health worker. If and when real provisions for preventive services are included, this will change the situation.

The proposed social security legislation brings to the fore another field in which there has been increasing tension. We refer to the relationships between the medical and public health professions. There has been an increasing organized opposition by the medical group to certain activities of the public health group. This opposition has centered upon those activities of the health worker in which personal prevention services have been rendered to the individual through group organization. The proposals to include certain types of medical care in the public health program have intensified this opposition.

We are convinced that a large part of the difficulty is due to a lack of a permanent effective mechanism for real contact between the governing bodies of the two organized groups. Such an arrangement has been in successful operation in England for many years. It has resulted in excellent relationships between the two groups, mutually helpful support for legitimate group objectives and improved curative and prevention services for the whole nation. We would advocate the exploration of the possibility of applying this idea to our problem of relationships at once.

NEED OF A 1935 CENSUS

DURING periods of normal prosperity, there has been in the United States, a pronounced movement of population from farms and villages to the cities. During the current industrial depression, however, this movement has been reversed; thus, the Department of Agriculture reported in 1933 that the rural population, which previously had been declining, had reached a new maximum.¹

As a result of these and other abnormal migratory movements, recent population estimates made by the customary procedure, of projecting past intercensal increase into the future, yield figures for most intra-state areas which obviously carry serious errors. In recognition of these errors, the U. S. Bureau of the Census has felt unable to issue intra-state population estimates for 1934, and later years.

A bill calling for a federal census in 1934 was introduced into Congress, but was defeated, in spite of widespread support, apparently because of implications claimed to have a bearing upon the 1934 Congressional elections. That objection has now disappeared; and the demand for a census has therefore been revived, and a new bill has been introduced looking toward enumeration in the fall of 1935, or spring of 1936.

The Council of the Vital Statistics Section of the American Public Health Association on February 3 adopted a resolution in support of the census, and a

similar resolution has subsequently been approved by the Executive Board of the Association. It is hoped that as many members of the Association as possible will supplement this action by writing to their representatives in Congress and to the Secretary of Commerce, Hon. Daniel C. Roper. The resolution of the Executive Board follows:

WHEREAS, during recent years, abnormal population interchanges between cities and rural regions have rendered impracticable the estimation of intra-state populations by the usual methods, with the result that the U. S. Bureau of the Census has deemed it inadvisable to issue for 1934, and later years, the intra-state population estimates required for the calculation of death rates, morbidity rates, and numerous other measures of social welfare, therefore be it
RESOLVED that the Executive Board of the American Public Health Association urge that Congress and the President provide for a general population census in the year 1935.

REFERENCE

1. *The Agricultural Situation*. U. S. Dept. of Agriculture, 17, 5 (May 1), 1933, pp. 2, 5.

THE REGISTRATION FEE AT ANNUAL MEETINGS

IT will be remembered that a fee for registration at our Annual Meeting was first established at Montreal in 1931. It is not out of order to review the reasoning of the Executive Board when the step was taken, as a background for the comments which will follow upon the Association's experience with the plan in the last 4 years and the hopes for the future.

Every member knows his Association is not endowed and that it is not wealthy. The dues he pays amount to only one-fourth of the total sum spent on him every year by the organization. In other words, the income from all classes of membership equals approximately \$25,000, while the Association expends \$100,000—the difference being made up by *Journal* advertising, by sales of commercial exhibit space, by sales of books, by grants from insurance companies and foundations, and by field service.

The membership dues have never been increased. In 1872, the year of the society's inauguration, membership dues were established at \$5 and have remained so to this day.

The Annual Meeting is an important Association function which unfortunately only a fraction of the membership finds it possible to attend. It is expensive to arrange and conduct. It must be self-supporting. Obviously, it would be unfair to distribute the costs over the entire membership by an increase in membership dues, as has been proposed on many occasions. The only equitable plan is to place a nominal charge upon those who receive actual, personal benefits through attendance at the Annual Meeting; therefore, the registration fee was the device employed to assure the necessary amount, over and above the income from the sale of exhibit space, for financing our convention.

Other factors influenced the Executive Board in the adoption of the registration fee. One was the tendency, inevitable under the circumstances, for an Annual Meeting city to be selected almost exclusively upon its financial possibilities. Can exhibit space be sold easily? Will the Local Committee guarantee to make up any deficit? These questions were paramount, though they were recognized as

being unworthy of promulgation by a scientific society with a professional dignity to maintain. The registration fee, it was urged, would make the Association more independent in considering its convention locations.

These arguments, and many others in favor of the registration fee plan, as valid today as they were 4 years ago, were presented again and again to the membership. How has the membership responded? Some kicked openly and manfully, as was their privilege. Most of these finally agreed that, as President Cleveland once said, "It was a condition and not a theory which confronted us." However, a study of the last three meetings has shown that many of our members, as well as those who take advantage of our meetings as guests, have evaded their responsibility. The following is not a pleasant picture, but the truth must be told.

At Washington, D. C., in 1932, there were 296 names on the program, of whom 207 were members and Fellows, yet only 158 of these registered. There were 89 non-members and only 18 of these registered.

At Indianapolis, there were 266 names on the program, of whom 204 were members and Fellows, with 152 registrations. There were 62 non-members, of whom only 11 registered.

At Pasadena, in 1934, there were 306 names on the program, of whom 220 were members and Fellows. Only 138 registered. There were 86 non-members, of whom 15 registered.

The picture is especially dismal because the figures given above apply to those who took advantage of program participation and the publicity resulting therefrom and at the same time ignored their obligation. Program time is a coveted privilege and surely those to whom it is given should have the interests of the Association sufficiently at heart to live up to its regulations.

The comparison between the names on the programs and the registration list is easily made and incontrovertible. It is impossible to check the number of members not on the program who also failed to register, but the assumption is that the percentages are about the same. This means, therefore, that probably there were in attendance at the last three annual meetings 30 per cent more members than the registration lists record. The proportion of unregistered to registered guests is undoubtedly even greater if the figures above are any criterion, and may be as high as 75 or 80 per cent.

This is a bad showing. It is unfair. There is no justification for it.

It is hard to believe that members and guests intentionally avoid registering because of the small sum of \$2.00 involved. The delegate receives infinitely more from attendance at the Annual Meeting than can be measured in dollars and cents. Every fair-minded member will admit it and ask himself if he wishes to be classed with those who accept the benefits of membership and withhold the support the Association deserves at his hands.

The Committee on Meetings and Publications, and the Executive Board, have been concerned over this problem. Recognizing the fundamental fairness of the registration fee and interpreting the attitude of the membership toward it as either carelessness or failure to understand properly its important function and necessity the Executive Board, at the instance of the Committee on Meetings and Publications, asks the *Journal* to explain again to our readers why the registration fee is necessary, and to urge them to support it. One hundred per cent coöperation depends upon such a simple thing as the determination of every delegate to register his attendance and pay his \$2.00.

When a regulation adopted by the governing body in good faith and in the

best interests of the society is repeatedly and thoughtlessly broken, it is incumbent upon the policy-making group to do one of two things, either repeal it or enforce it. In the case of the registration fee, the Executive Board has seen fit to decide to enforce it, even to the extent of admitting to the scientific sessions only those delegates who display badges, indicating that they have registered. Members who have faithfully lived up to every demand made upon them, and who will continue to do so, will undoubtedly on occasion be inconvenienced by this, as well as those uncoöperative ones who have made the regulation necessary. To the former apologies are extended in advance, and their forbearance bespoken.

The American Public Health Association has a record of achievement of which all members should be proud. It is an honor to belong to such an Association, and the very few foreigners who have been elected to Honorary Fellowship appreciate highly the honor paid them. Practically every advance in public health measures can be traced to members of our Association, and most of them have been acted on officially by our body.

May we not insist once more that membership in the American Public Health Association is an honor to be sought after? May we not appeal to the patriotism of our membership to induce them to register at our meetings and pay their fees and urge their non-member friends in attendance to do likewise?

PUBLIC HEALTH EDUCATION*

Flamboyant and Not Polite—
Mother and Child, London, does not seem to like public health education methods in the United States:

Health propaganda is to be studied at its flamboyant best in the United States of America, the cradle of this doubtful and difficult art; but a slavish imitation of American methods could never succeed in this country, where people are inclined to be affronted by the flamboyancy so effective in America, and where the approach must, above all things, be polite. To be fairly immune against the effect of the propaganda is perhaps a matter for self-congratulation, but it makes the propagandist's job a very difficult one.

The National Baby Week Council has done much to develop health propaganda in this country. It has experimented with various methods and has encouraged local enterprise. It is helping to create a new style, authoritative yet conservative, a style which manages to affect British opinion without offending reticence.

In *Mother and Child*, 5, Tavistock Sq., London, W. C. 1. Feb., 1935. 9d. a copy.

"Medicine Men Take to the Air"
—Under this title, *Business Week* tells about the rapid increase in the use of broadcast time by drug and cosmetic companies.

Some trade observers suggest that drug men are rediscovering the "medicine man" selling technic. But, says *Business Week*:

Others see in it more sinister implications. Curative and therapeutic claims, they point out, can be advanced with considerably less risk over the air than through the medium of the printed page. Censors have more difficulty checking them beforehand; critics find it less easy to prove a case against them

afterward. And during the past year, because of the agitation over new food and drug legislation, curative and therapeutic claims have been subjected to far more exacting scrutiny than ever before—both by publishers and by the advertising review committee of the Proprietary Association which claims that it has inspected 27 millions' worth of advertising in the past 5 months.

The editor credits radio with efforts in the direction of censorship of claims for cures.

Radio's troubles with curative and therapeutic claims are not, however, limited solely to the broadcasts sponsored by the drug and cosmetic manufacturers. Apparently encouraged ("challenged" might be the better word) by the success of these programs, food sponsors are emphasizing with growing insistence the health values of their products. Nor are these claims confined to such broadcasts as those sponsored by Fleischmann's Yeast, Cocomalt, Ovaltine, and Postum; cereal manufacturers are making aggressive moves in this direction, and lately even Wrigley's has recommended chewing gum for its healthful and beautifying effects.

In *Business Week*, 330 W. 42d St., New York, N. Y. Feb. 9, 1935. 20 cents.

A.P.H.A. Year Book: 1934-1935
—Readers of this section will wish to study the "Resolutions" chapter for possible reminders of emphasis desirable in the months ahead.

Likewise a review of the numerous committee reports may provide valuable background material, especially when we need statements of approved practices or of aims in special fields.

Be sure to check possible uses of the objectives (and their "first fruits") of the A.P.H.A. which correspond closely with the objectives of public health. (We do wish that there was recognition of popular health education

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

as a large factor in making possible the harvesting of the "first fruits" there listed.)

P.H.E. Section in the Year Book—The Year Book, 1934-1935, record for the Public Health Education Section:

Committee on Fellowship and Membership—William P. Shepard, M.D.

Committee on Administrative Practice—Ira V. Hiscock on Sub-Committees on Record Form, Manual of Public Health Administration, Annual City Health Department Reports, and Relationship of Social Workers to Public Health.

Committee on Professional Education—C. E. Turner, Dr.P.H., Secretary; John Sundwall, M.D. Sub-committee on Training and Qualifications of Health Officers—C. E. Turner, Dr.P.H. Sub-committee on Training of Public Health Educators—C. E. Turner, Dr.P.H., Chairman; John Sundwall, M.D.; William P. Shepard, M.D.; Mary P. Connelly, R.N.; Edna A. Gerken.

Committee on Meetings and Publications—Homer N. Calver. Associate Editors of *Journal*—Evert G. Routzahn. Sub-committee on Scientific Exhibits—Homer N. Calver, Chairman; Bertrand Brown; H. E. Kleinschmidt, M.D.; Evert G. Routzahn.

Committee on Research and Standards—C. E. Turner, Dr.P.H.

Nominating Committee—W. W. Peter, M.D.
Committee on American Museum of Hygiene—Homer N. Calver; Bertrand Brown; Evert G. Routzahn.

Committee of P.H.E. Section on Methods in Health Education—Ira V. Hiscock, Chairman; Homer N. Calver; Mary P. Connelly; Iago Galdston, M.D.; Elizabeth Nickerson; Evert G. Routzahn; William P. Shepard, M.D.; C. E. Turner, Dr.P.H.

What Shall We Call It?—A terminology Committee of the Health Education Section of the American Physical Education Association has tackled a much needed job. The committee has prepared terms and definitions, largely from the angle of school health education.

A report will be presented for action at the annual meeting of the A.P.E.A. in April. The committee, Jesse Feiring Williams, Chairman, includes among

others, Louise Strachan and Anne Whitney.

In anticipation of the final action we give but three of the terms to illustrate what is being done. The term and definition appear in italics; followed by

. . . a paragraph of informal discussion that seeks to amplify the definition, to give the reasons for the decision made, or to indicate more specifically the application or limitation of the term.

I. Health Education is the sum of all experiences which favorably influence habits, attitudes, and knowledge relating to individual, community, and racial health.

Health Education is a general term covering a wide field of human experiences. It includes more than just instruction in health and should be used to designate the broader field.

II. School Health Education is that part of Health Education that takes place in school or through efforts organized and conducted by school personnel.

The child is educated in health in all his experiences that in any way influence favorably his habits, attitudes, and knowledge relating to health, but the experiences he has that emerge from and are identified with school life are those of *School Health Education*.

This aspect of *Health Education* is definitely linked with *Public Health Education* as it operates in the home and community.

III. Public Health Education is that part of Health Education that takes place in home and community.

This phase of *Health Education* operates largely through the efforts of health departments and various semi-public or private agencies interested in promoting health among the people. As a rule the methods used are those of general publicity such as radio, newspapers, distribution of literature, lectures, study groups, conferences etc., but the work done in homes by public health personnel is also *Public Health Education*.

Public Health Education reaches children as well as adults and thus is one kind of experience relating to health.

The public health official who comes into the school to control communicable disease is

in effect a school official and hence this experience of the child may be regarded reasonably as an aspect of *School Health Education*.

Meet "Bill the Driller"—*Ohio Health News* reminds its readers that more drilled-well water supplies are contaminated from above than from below the surface. The *News* quotes from *Johnson's National Driller* what "Bill the Driller" says on the subject:

Fer th' good of our own business as well as th' safety of our customers, us well drillers ought to follow ev'ry reasonable thing that th' health officers, engineers or other people suggest to protect our wells from pollution. I never cut off th' top of a well casin' below ground level if I can help it, an' where I have, I seal th' top around th' pump an' casin' both as tight an' fool-proof as I can. I arrange fer drainage into a gravel fill an' keep a sharp eye against chances fer floodin' from th' surface or sewers.

More paragraphs follow, but the above is enough to suggest that health agencies look up well drillers and "get them educated." Also enough is quoted to emphasize the idea that we try to present health and trade health responsibilities in terms of the different crafts and professions.

Ohio Health News, State Dept. of Health, Columbus. Jan. 1, 1935.

"Exhibit of Food Fads and Fallacies," by H. S. Mitchell, tells of an exhibit of materials about food fads and fallacies as a part of a community education project. The exhibit was shown at a recent meeting of the American Dietetic Association.

Every home economist is aware of the fact that there is much false printed material in circulation in the form of advertisements and magazine and newspaper articles. Samples of such quack publications come to our attention at intervals, but a large collection of such material arranged so that it can easily be read, makes a striking educational exhibit and brings out the point that it is not always a simple matter to choose between the true and the false. Even for a group of dietitians it was necessary to label carefully the false ma-

terial to avoid any chance of misinterpretation. The worst statements or paragraphs were underlined or marked in bright red.

The printed matter was mounted on large black cardboards.

"What about Food Combinations," with a large question mark following it, was the heading on a board which carried samples of some 15 or more articles and tables of foods stating which should or should not be combined. The dire consequences of the wrong combinations designated by one "authority" as likely to produce toxic poisons, by another as leading to the possibility of an explosion, were well worth underlining. Such fads about food combinations have perhaps swept the east and west coasts more than other parts of the country, but in general an intelligent group of people is apparently being won over by these erroneous ideas.

"Is there Supermagic in Minerals?" was the heading for

. . . numerous magazine articles in which some specific mineral was presented as a panacea for many ills. In other instances famous movie stars and other prominent people were pictured and designated as belonging to particular mineral types and requiring specific foods because of these types. Iodized foods were recommended as panaceas for a variety of ailments.

"Short Cuts to Reducing?" introduced

. . . samples of the many advertisements for quick-reducing remedies (the dangers of which are well recognized by any home economist), especially mineral water, salts, and remedies containing dangerous drugs, all recommended by their various advocates.

"Do You Believe Everything You Read?" headed other groups of false advertising and fallacious articles. "The Nutritionist Looks at Food Fads" headed a collection of sound articles, some of which are listed.

In *Journal of Home Economics*, 101 East 20th St., Baltimore, Md., Feb., 1935. 30 cents. In the same issue see editorial on "Food Fads and Fallacies."

Those interested may learn through American Dietetic Association, 25 E. Washington St., Chicago, Ill., if your state has made up an exhibit.

The general idea may be worked out in a variety of ways. The headings suggest a series of articles, a study course, or meeting topics. This approach could be applied beyond the field of food, and even without reference to misleading articles or advertising. The exhibit plan illustrates the possibility of reexamining our material for new angles of presentation.

How the Smiths Learned and Shared—Jean Pinney undertakes to answer "How Much Does the Public Know about Social Hygiene?" And her effective device for showing progress is to tell the story of the Smiths, what they said and what they did, from immediately before the Great War up until today. It is a genuine "success story" for the social hygiene movement, but it presents a convincing moving picture of changing ideas and effective activities. This article with other material in the Jan. and Feb., 1935, issues of *Journal of Social Hygiene*, constitute one of the best annual reports of a national health agency and of a national health movement. Address: 50 West 50th St., New York, N. Y. Each issue, 35 cents.

Using People in Rural Communities—"Utilizing Organized Groups in a County Nursing Program," by A. B. Stoll, might well read "Utilizing Organized Groups in a County Health Program." Read before a Jackson, Miss., conference it is a small city and rural presentation.

From "How to Use Volunteer Help Effectively" we quote:

Going to our card index or notebook, we hunt through it, finding out what special interests we have tabulated among the committee members. Here we have one who has studied typing and can get no work. When we ask her if she is losing her skill and speed, we often find she is worried over just that thing. She will be a rare person if she will not help us with some of our clerical work

and indirectly keep herself in form. She can be taught mimeographing and can assist in preparing the quarterly reports for the central health committee. Others may want to keep up in dictation. Requests sent in to graduates of night school often bring results.

Occasionally, we may find someone who has a special talent for writing who may prepare excellent articles with local interest from authentic information. He also would be responsible for publishing news items concerning the activities of his own committees.

Those who can entertain successfully in their own homes will be interested in planning exhibits, programs, and entertainments for their organization.

Add gradually to your card index another section containing the names of the people whom the health department has helped outstandingly. I recall a story of a health officer who said he had discovered that a child of a lawyer needed glasses badly. The father looked up the director and expressed his appreciation to him and then the father added, "Why, the little fellow has always been that way and we didn't know he couldn't see." When that officer has difficulties, he goes to that man and things mysteriously happen. We have all had experiences like that and we forget about them. But in time of stress such information could be turned over to your health committees and the services we gave, without thought, could come back bearing multiplied results—not to us, but for increased opportunity for service to others.

In *Public Health Nursing*, 50 West 50th St., New York, N. Y. Jan., 1935. 35 cents.

The School Nurse Helps the Teacher—How the school nurse shares in educational work is brought out by E. N. Scramlin in "The School Public Health Nurse a Health Educator." One

important educational contribution of the school nurse should be that of serving as adviser to the teachers. The teaching profession is probably one of the most harassed in the world. However eager a teacher may be, it is humanly impossible for her to keep abreast of all the topics in which she is interested, and almost no field of information changes so rapidly as that of health. Scientific research today renders yesterday's dogma obsolete tomorrow. The nurse may make one of her most valuable contributions that of acting in an advisory capacity to the teachers,

keeping them posted on the best bibliographies, and assisting them in evaluating health books and other sources of health information.

Other specific opportunities are mentioned, and it is emphasized that

In a wider sense the school nurse becomes a teacher and educator with every professional contact she makes, whether it be with student, teacher, or parent. Every physical examination should be done with the coöperation and interest of the student that it may become a teaching situation of value. Every inspection of an ill child and every case of first aid is a learning situation. The nurse who understands will create with every contact a favorable attitude not only toward the medical profession but toward finer ideals and standards of living in the child.

In *Public Health Nursing*, 50 West 50th Street, New York, N. Y. Feb., 1935. 35 cents.

Hygeia, March, 1935—Background and quotable material offered in *Hygeia*, American Medical Assn., 535 N. Dearborn St., Chicago:

Animal experimentation. Mental strain masking as physical disease. Food fads (against generalized hard and fast rules). If you have a lump in your breast. Pneumonia. Massage vs. mauling. Healthgrams. Posture. Slum elimination. Beulah's Bunion (a fable). A.M.A. committee on fish. The house fly. Eye diseases during adolescence. A straight face and straight teeth. How to make health attractive to the child. Tonsils and tact. What to do and what not to do for fever. The medicine men (a puppet play).

Under "School and Health":

The classroom teacher studies the community. Health teaching in March. Solving health education problems. New health books for teachers and pupils.

Hygeia will send a copy free to a teacher or health worker.

Simple Dramatics—"The Medicine Men," by John Finney, is one of the few adaptations of health material for puppet presentation. For children/adults—by children/adults.

"The World's a Stage," by Sophia

Yarnall, tells of a mother's use of costume plays and home "broadcasting" by young children. This project offers possibilities where health stories are available, say to members of parent-teacher groups, and others. Copies of this article or condensed explanations of the idea may be used in testing the project.

Both in *Hygeia*, 535 N. Dearborn St., Chicago, Ill. March, 1935.

England Honors Hamilton's Health Education—The Hamilton, Ont., Public Health Dept. has been honored by having two pieces of health propaganda reproduced in *Mother and Child*, 5, Tavistock Sq., London, W. C. 1, together with this comment:

The Hamilton (Ontario, Canada) board of health has a remarkable gift for keeping its activities "in the news." The *Hamilton Spectator* periodically devotes an entire issue to the question of public health. The latest special health issue is an excellent example of good journalism and sound propaganda.

Education Against Cancer—From "The Present Status of the Educational Campaign Against Cancer" we quote:

It is very human and understandable to attack an obvious condition that announces its own presence. Such efforts should be continued. They are laudable and constructive. These facts, however, should not blind us to the greater problems which call for long-time and general coöperation.

The effort needed to organize and establish a national educational campaign in any phase of public health, is so great that no group or groups care to undertake such a program without a great deal of careful preliminary study. This work has actually formed a considerable part of the society's program during the past 5 years.

It has been necessary first of all for the American Society for the Control of Cancer to establish in its own mind beyond any doubt that certain types of cancer in their early stages are curable. This it has done.

It has next been necessary for some one to study the facilities for treatment and to aid in informing the medical profession of what can be accomplished. This work is being

splendidly performed by the American College of Surgeons, the American Medical Association, and by the various National Radiological Societies.

Having carefully built up a foundation of scientific and medical knowledge concerning the disease itself and the facilities for its treatment, the next step is clear. This consists of the establishment of local organizations which will assume the responsibility and expense of educating the laity to recognize signs and symptoms which may mean cancer and to report those signs and symptoms *immediately* for diagnosis and treatment. This work will form the major activity of the American Society for the Control of Cancer for some years to come.

The Board of Directors of the Society are hard at work on the problem and an important announcement of the future program may shortly be expected.

In *Bulletin*, Am. Society for Control of Cancer, 1250 6th Ave., New York, N. Y. Feb., 1935. 10 cents.

MAGAZINE ARTICLES

"Has Insulin Failed?" by Dr. W. W. Bauer. *American Mercury*, 730 5th Ave., New York, N. Y. Nov., 1934.

"Poison Hunters," by R. Lord. The food and drug staff of Dept. of Agriculture. *Today*, 152 West 42d St., New York, N. Y. Feb. 2, 1935. 10 cents.

NEW

Flashes, State Committee on Tuberculosis and Public Health, S.C.A.A., 105 East 22d St., New York, N. Y. House organ for county and city workers throughout the state. Mimeographed, with two-color printed cover sheet, date and number being mimeographed on the printed sheet.

RADIO

Is it WEAf or W.E.A.F.—as it appears anywhere but in a health agency release or a health publication?

Reported by *Education by Radio* (1201 16th St., N.W., Washington, D. C.), Jan., 1935:

Radio station CKUA, the University of Alberta, Edmonton, Alberta, presented on

Monday, January 7, a program entitled, "Venereal Diseases—Prevention and Control." The speaker was Dr. Harold Orr, director, social hygiene division, Provincial Department of Health. The program was given at 2 p.m. and was presented not only by the University station, but by stations CFAC and CJOC.

Says *Variety*, amusement weekly:

Radio has been guilty of cheapness and tawdriness and phony sentimentality, but it's always been on the side of obedience, reverence, holy wedlock, and spinach. . . . Radio is probably the most sanctified amusement in history.

"Keeping Well," is made up of "the first 100 radio talks broadcast by Baltimore City Health Department and Medical and Chirurgical Faculty of Maryland from Station WBAL." 193 pages; contents and index; list of the Public Instruction Committee of the Faculty. The 100 talks include one monologue and two dialogues.

"A Day in an Emergency Ward," by Dr. J. J. Moorhead, was an effective idea for a broadcast. In this particular instance this was less description and more appeal for support than usually would interest the radio audience. United Hospital Fund, 122 East 22d St., New York, N. Y.

"The Romance of a Hospital," by B. Fingerhood. Explaining some misunderstood aspects of the hospital. *Bulletin*, Am. Hospital Assn., 18 East Division St., Chicago, Ill. Jan., 1935.

"Common Sense and the Child," an English broadcast series included some catching titles:

Running a dinner centre for country school children. Is he growing properly? "Catching" illnesses. Should he have a dose? Aches and pains.

A.M.A. broadcasts are scheduled over N.B.C. at 5 p.m., E.S.T., Tuesdays; over C.B.S., Thursdays at 4:30 p.m. A list of the stations appears in *Hygeia*.

American Medical Assn. broadcasts in March:

Surgery in diabetics. Food and drug law

revisions. White collar hazards. Plans for economic security. Headache. Physical defects. Rickets. This is no April fool.

Baltimore Health Dept. and Medical and Chirurgical Faculty broadcasts:

The health of your child in school. Baltimore's health record for 1934. Oysters. Infected eyes in infants. A day with a public health nurse. City health for a cent and a half (health in city tax dollar). Meningitis. Your heart at fifty. Rheumatic fever and the heart. Some Christmas cautions. The pestilence that walketh in darkness (tuberculosis). What to do until the doctor comes.

Connecticut Dept. of Health broadcasts over WTIC:

Controlling your weight. The laboratory an ally in pneumonia. Health protection in industry pays. Keeping your child well during the winter months. Things are seldom what they seem (problem behavior). Statistics measure progress. Bad news for pneumonia germs. Dividends from public health work. Working environment (occupational disease). Man's struggle for health. Finding defects early. Unusual accidents. Safeguards for public water supplies.

The Hartford, Conn., Tuberculosis and Public Health Society has had a twice weekly radio program: over WTIC in coöperation with Hartford Medical Society; with lay speakers over WDRC on the health activities of various local agencies. Some of the topics:

That fat bugaboo. The hoarse voice. Diagnosis and correction of posture defects. Oral hygiene. Overcoming tuberculosis. Neuritis and neuralgia. Child guidance. The cross-eyed child. Diabetes and tuberculosis. Diet and digestion.

Illinois Dept. of Public Health broadcasts over WCFL:

Enemies 1/8000 inch in length. Health progress in 1934. Shell shock in everyday life. When a fellow needs a friend. Science and human guinea pigs. Fighting foes too small to see.

Illinois Dept. of Public Health broadcasts over WGN:

Mental hygiene faces the newer facts. Crime and the new deal in mental hygiene. Are you superstitious? On the fringe of

silence. The biological miracle of five centuries. Medicine marches on. Hair-raising information. The "white-collar disease."

Minnesota State Medical Assn. broadcasts (Tuesday) over WCCO:

Insomnia. Appendicitis. Problems of the blind. Cancer research.

DATES AHEAD

Among these may be found opportunities for coöperation with other groups; timely angles for newspaper, radio, or public speaking material.

May 1, 1935: May Day—Child Health Day. Write to your State May Day Chairman or to your State Health Dept.

April 27–May 4, 1935: Youth Week. "Designed to include boys and girls from about 10 to 18 years of age." Address National Youth Week Committee, 35 E. Wacker Drive, Chicago, Ill. Wednesday, May 1: Youth's Health Day and Evening at Home.

To stress the responsibility of the family for the welfare of boys and girls and to emphasize the importance of having a sound body to insure a sound mind.

May 11, 1935: American Indian Day. Health implications for boys and girls.

May 12, 1935: Mother's Day. "To make maternity safe" in the country where it is more dangerous to be a mother than almost any other known as "civilized." Address Maternity Center Assn., 1 East 57th St., New York, N. Y.

May 12, 1935: National Hospital Day. A "bulletin of 35 suggestions for its observance" will be supplied by American Hospital Assn., 18 E. Division St., Chicago, Ill. Arrangements have been made for hundreds of addresses, and for broadcasts from over 50 stations.

MOTION PICTURES

American Medical Assn., 535 N. Dearborn St., Chicago, Ill., has prepared a 16mm picture

. . . so that county and state medical societies as well as other organizations might be informed of the nature of the work in the headquarters office. . . . It shows the personnel of the various bureaus and councils of the Association, the executive officers, the members of the Board of Trustees and of the House of Delegates, the composing, printing, binding, addressing and mailing departments, the manuscript editing rooms and the library, and many other activities of the headquarters office. . . . It is planned to add pictures of all the different councils and official bodies so that the film will constitute a true record of the history of the Association at this time. Adequate subtitles explain the nature of the work shown, but the affairs are so complex that space is simply not available in a subtitle to indicate fully the significance of the various activities. The Board of Trustees and the office of the Secretary of the Association will be interested in hearing from county and state medical societies or other bodies that are interested in showing this film.

State Dept. of Health, Albany, N. Y., is using a picture produced by Bureau of Milk Publicity, Dept. of Agriculture and Markets:

Three clowns—Health, Pep, and Strength—demonstrate the advantages of milk. Flashes of actual persons engaged in sports, business and other activities, combined with animated cartoons of elflike characters, cleverly illustrate the importance of milk as a principal source of the food elements essential to proper growth and development of the human body. Pictures of the dairy industry show the sanitary methods essential in each step of the production and distribution of safe milk, from the farmer's pail to the consumer.

A news dispatch is quoted in *Health*, Canadian Social Hygiene Council, 105 Bond St., Toronto, Ont.:

Officials of the Canadian Social Hygiene Council are gratified that the showing of a picture produced by the council provoked a debate in the House of Lords in London on the need for certificates of medical fitness for parties proposing to marry.

The debate was instigated by Lord Kilmaine who mentioned that he had seen the picture, "Damaged Lives," an educational picture dealing with the problem of social disease, produced under the technical direction of Dr. Gordon Bates, General Director of the Canadian Social Hygiene Council.

This picture, according to the council, has

been shown to millions of persons in a large part of the civilized world. Its showings in England were with the full approval of the British health ministry and social hygiene council. It has also been shown in Canada, United States, Australia, New Zealand, Mexico, Argentina, Chile, Brazil, France, and Spain.

MOTION PICTURES IN ENGLAND

A recent motion picture is "Rules for Jim," by National Baby Week Council, 117, Piccadilly, London, W. I. The sound version, 12 minutes; silent, 15 minutes.

"How to Run a Schick Clinic without Tears" pictures clinic methods which have met the fears and doubts of parents, and is the outgrowth of 5 years of successful campaigning by Dr. E. H. T. Nash, Medical Officer of Health, Hounslow, Middlesex, England. The film is being offered for use throughout the kingdom.

A new 16mm film is offered by National Council for Maternity and Child Welfare, 117, Piccadilly, London, W. I., which

. . . represents a mother bathing her baby in her own home. The different scenes illustrate undressing, habit training, bathing, making up the cot, and the activity of a normal healthy infant. This film should make an appeal to many and various audiences, partly on account of its human interest so delightfully illustrated by the activities, cries and smiles of a perfect 2 months old infant, and also on account of the technical accuracy which Sister Kennedy expresses in such a calm, unhurried manner. It will delight and instruct at the same time, and prove of great value to Health Week campaigns, infant welfare centres, women's groups, fathers' councils and to school-girls.

REPORTING

"Activities—1934" is a mimeographed report of Rapides Parish Health Unit, La. Several pages of description and comment; statistics; and illustrated cover—health problems on left, health activities on right. The kraft paper is a bit dark, but then it is "a Louisiana product."

The annual report of Lincoln, Neb., Board of Health is 4 by 9 inches in size, 16 pages and cover. The usual dull appearance of statistical tables seems to be lessened by the narrow pages. Some brief explanatory paragraphs will help the lay reader to get the significance of some of the data.

"Estado de Nuevo Mexico Departamento de Salubridad Publica, El Octavo Informe Bienal, 1933-1934" appears on one cover of a 40 page pamphlet, but turned over the cover reads: "State of New Mexico Bureau of Public Health, Eighth Biennial Report, 1933-1934." The text and *table of contents* appear in both languages.

"Guarding the Health of Baltimore" is an attractive looking pamphlet of 35 pages issued annually by Baltimore Health Dept. A reprint of the Commissioner's Report from the annual report; pleasing blue cover; text on rough finish paper. Illustrated.

"Health unlocks the door to happiness" is the "Health Officer's 1934 Report, Middletown, N. Y." Mimeographed; 15 letter-size pages; illustrated. Tint and weight of paper, quality of mimeographing, the illustrations, and the homely comment place this in the front rank of small city reports. *It has a table of contents.* Report mentions that a Middletown leaflet on diphtheria was reproduced in several cities.

In "Fifty Years of Health Progress in Rochester" the bulletin of Rochester, N. Y., Bureau of Health, makes good use of the historical comparison. The 50 years includes the full period for which Rochester has comparable figures.

Palo Alto, Calif., Health Dept. issues an annual report with an unofficial looking cover, but dignified and pleasing.

A self-indexed annual report of the

Florida Tuberculosis and Health Assn., Jacksonville, is small enough for correspondence enclosure and pleasing enough for popular reading. Each of 8 leaves is a half inch wider than the preceding one so that the "contents" may be read from left to right on the unopened pamphlet. Copy for 3 cents.

"Ten Years at Bellevue-Yorkville: An Experiment in Health Center Administration" is the report of a meeting which practically marked the close of the last of the group of health demonstrations in New York State. The project continues as a municipal health center at 325 East 38th St. Mention is made of 3,000,000 pamphlets having been distributed in the district.

Students Study at a Sanatorium—High school seniors are being given first hand information about tuberculosis prevention and treatment as illustrated by the equipment and practices of a tuberculosis sanatorium under the sponsorship of the St. Louis Tuberculosis and Health Society.

Groups are taken through Robert Koch Sanatorium with explanations and demonstrations of equipment for diagnosis and treatment. A question and answer session follows in the auditorium of the hospital, together with a motion picture illustrating the main points to understand about tuberculosis.

According to a check-up of the students who have attended these sessions it is reported that "100 per cent felt that they had definitely benefitted by the classes." A general finding is that fear has been dispelled and interest become more active among these students. Some local education and health authorities have suggested that the plan be extended to lower grades.

BOOKS AND REPORTS

A REVIEW OF SELECTED BOOKS OF INTEREST TO PUBLIC HEALTH WORKERS

MAZŮCK P. RAVENEL, M.D.

FOR several years we have omitted our annual review of books on public health, partly because there were fewer received and partly on account of financial conditions. During 1934 there have been a number of excellent books and it has seemed wise to renew the custom of an annual review. This covers books reviewed in our *Journal* in 1934 as well as some which have been received but reviews of which have not yet been published, though some of them have been written. We have also followed the reviews in a number of other journals, in England and this country. Under the head "Miscellaneous" will be found a number of titles which might very well be classed under other heads. We have avoided German and French books which have not been translated and published either in England or this country. One French book is of such importance, however, that we have included it.

Perhaps the workers in industrial hygiene have been more active than other groups. There have been many incidents which have brought the problems of industry strikingly before the public. There have been many new chemicals, some of which are poisonous, brought into use in various lines of work, which have raised new questions and led to suits for compensation. Among important books on this subject we may mention *The Human Problems of an Industrial Civilization*, by Elton Mayo, Macmillan. This is made up of the Lowell Lectures for 1933, and will interest all who have to do with employee problems. There is no adverse criticism to be made of *Science of Work*,

by Morris S. Viteles, Norton. It covers a large field. The selections are well made and the illustrative material is concrete and to the point. It is obviously written for non-technical readers, but is systematic and well done. *Industrial Health Service*, by L. D. Bristol, Lea & Febiger, gives the first appraisal forms, (1) for smaller industries; (2) for personnel and industrial relations services, though they were considered in the section on Industrial Hygiene of the Association, and a suggested form presented to our Committee on Standard Practices in 1932. *Industrial Toxicology*, by Alice Hamilton, Harper, is an excellently organized, comprehensive, and terse book, and is especially timely on account of the many new chemicals used in various industries, especially dyeing, rubber manufacture, metal plating, etc.

Few subjects have been less understood than heating and ventilation, though of great importance, since workers in many lines are exposed to extensive ranges in moisture and temperature. *The Principles of Heating and Ventilation*, by H. M. Vernon, Edwin Arnold & Co., has been described as "a source of welcome enlightenment indeed." An outstanding book is *Industrial Maladies*, by the late Sir Thomas M. Legge, Oxford Medical Publications. Unfortunately, this well known student of industrial diseases has passed away. Studies of much significance are *Occupation and Health*, Vol. II, Letters I to Z, International Labour Office; and *Death Rates by Occupation* by Jessamine S. Whitney,

National Tuberculosis Association. The various types of pneumoconiosis are among the more urgent problems in industrial hygiene. Some firms have been forced to the wall by claims for damages. Abrasives are much used. A striking instance of injurious work is that of a tunnel bored through rock containing much quartz. Physicians, engineers and others are called on to testify in such cases and to arbitrate and adjust claims. For them, such a book as *The Pneumoconiosis Bibliography and Laws*, by Davis, Salmonsen and Earlywine, *Industrial Medicine*, is of much value. The tunnel incident, which led to a number of suits, brought out *Symposium on Silicosis*, by Trudeau School of Tuberculosis, Employers' Mutuals, Wausau, Wis., which is indispensable to those interested in the silicosis question.

The importance of the nursing profession and especially of the public health nurse is coming each year more and more to the fore. Among the books on this subject we will mention *Survey to Public Health Nursing*, by N.O.P.H.N., Commonwealth Fund. It will be seen that this is authoritative, having been handled by the organization devoted to public health nursing. Interesting and valuable is *Nursing History*, by Minnie Goodnow, Saunders, which is unusual in its type and scope, being very human and showing the trend of the care of the sick up through the ages, and mentioning even the care of animals in some conditions. Among special subjects are *Obstetrical Nursing*, by Carolyn Van Blarcom, Macmillan; *Pediatric Nursing*, by Gladys Sellew, 3rd ed., Saunders; and *Keeping Campers Fit: The Theory and Practice of Camp Nursing*, by Elena E. Williams, Dutton. The latter is a rather unusual book, useful on account of the many summer camps in various parts of the country. It discusses the types of cases likely to be met with by

the camp nurse, and gives first aid for them. The author regards these camps as a useful field for practice.

America has made a bad showing on the score of maternal mortality, two especially useful studies of which have appeared during the year. *Maternal Mortality in New York City*, by Committee on Public Health Relations, New York Academy of Medicine, Commonwealth Fund, is a timely and valuable study, applicable especially to New York City, but containing much material of general application. *Maternal Mortality and Morbidity*, by J. M. Munro Kerr, Wood, is a most complete and exhaustive study, and while made on material gathered in England, Scotland, and Wales, the basic factors are comparable with those in the United States.

History: Two most interesting books, *Chinese Medicine*, by William R. Morse, Hoeber; and *Japanese Medicine*, by Y. Fujikawa, Hoeber, belonging to the series, "Clio Medica," edited by E. B. Krumbhaar, have appeared. They cover the story in a remarkably succinct manner from ancient times up to the present. Several books of a more or less general type giving much medical history have appeared. Perhaps the best of these is *Medicine: A Voyage of Discovery*, by Josef Lobel, Farrar & Rinehart. It is an exaltation of medicine, most interesting and correct for the most part. A book with an engaging title, *The Great Doctors*, by Henry E. Sigerist, Norton, should be mentioned, which in spite of inaccuracies in statement as well as in implication, contains useful material. Bacteriology, on which modern public health is largely founded, has been greatly aided through the invention of the Abbe condenser and the use of aniline dyes. The Biological Stain Commission, with headquarters at Geneva, N. Y., has put laboratory men of all kinds in its debt, which is now

increased by *The History of Staining*, by H. J. Conn, a most valuable contribution.

Allied to medical history is *Great Men of Science*, by Philipp Lenard, Macmillan, which contains material concerning men of science which should be more or less familiar to all educated people.

In this group might well be classed some notable biographies and autobiographies. *Lord Lister: The Discoverer of Antiseptic Surgery*, by C. J. S. Thompson, John Bale, Sons and Danielsson, is a short and excellent picture, with many facts drawn from the classic biography by Sir Rickman John Godlee. *Benjamin Rush*, by Nathan G. Goodman, University of Pennsylvania Press, is the first biography ever written of Benjamin Rush, known as "The American Sydenham," in spite of the many articles and books written on certain phases of his career. It is excellently done and should be in the library of every physician in the United States. *The Joy of Living*, by Franklin H. Martin, Doubleday, is by one of the most efficient and active medical organizers in this country or any other. He has lived through a period characterized by great advances along practically all lines, and gives an interesting account of his experiences in pushing the interests of the medical profession forward. *A Soldier in Science*, by Bailey K. Ashford, William Morrow & Co., appeared a short time before the author's death. It is delightfully written, and though we cannot agree with all the author claims, there is no question that his work had a profound influence on health in the tropics and on the study of tropical disease.

Health officers particularly should know a great deal about veterinary medicine. *Manual of Veterinary Bacteriology*, 2nd ed., by Raymond L. Kelser, Williams & Wilkins, is a book by a man whose experience in the Army

has led to constant associations with medical men as well as with biologists, and the practical application of scientific knowledge. There is a chapter on protozoa by Charles F. Craig. *The Biology of Bacteriology*, by Arthur T. Henrici, D. C. Heath & Co., is a useful book, written from an unusual angle. New editions which deserve mention are *Pathogenic Microorganisms*, by William H. Park and Anna W. Williams, Lea & Febiger, 10th ed.; *Bergey's Manual of Determinative Bacteriology*, Williams & Wilkins, 4th ed. *A Text-Book of Bacteriology*, by Hans Zinsser and S. Bayne-Jones, Appleton-Century, though called the 7th edition of the book by Hiss and Zinsser, is practically a new work, considerably enlarged and brought much more up to date.

Under this head we must mention *Text-Book of Meat Inspection*, by Robert V. Ostertag. Translated by C. P. Marshall, and edited by T. Dunlop Young, Alex Eger. This is an entirely new book by a master. The translation is excellently done and both the English and American editions have been edited by a veterinarian. In the appendices are given the laws regarding slaughter, handling, curing, and sale of meats in Germany, England, Australia, and America. It should be in the hands of all health officers though written especially for veterinary physicians, many of whom hold positions in the inspection service. *Text-Book of Meat Hygiene*, by Richard Edelmann, 6th ed., translated by John H. Mohler and Adolph Einhorn, Lea & Febiger—This translation of the 6th German edition has been well done. It is a smaller book than that by Ostertag, and excellent in every respect.

Outline of Immunity, by W. W. C. Topley, Wood, is a new book which shows a mastery of the intricate subject of which it treats. The facts and theories are clearly stated. The importance of protozoan diseases need not

be emphasized, since epidemics during the past 2 years have done that for us. We welcome that standard work *Biology of the Protozoa*, by Gary N. Calkins, 2nd ed., Lea & Febiger. This second edition of a well known book contains a new chapter on parasitism and disease, adding much to its practical value.

Two excellent books have appeared on physical education. *Safety in Physical Education in Secondary Schools*, by Frank S. Lloyd, National Bureau of Casualty and Surety Underwriters, New York, is extremely valuable, especially for those responsible for secondary school activities. The second is *Administration of Health and Physical Education*, by Jesse Feiring Williams and Clifford Lee Brownell, Saunders. Everything written by Dr. Williams is well worth reading. This book will be especially useful to heads of physical education departments, and we must commend the idea of the authors in stressing physical education as a health measure.

Nutrition has, as usual, received considerable attention. Everyone will be glad to see a revised edition of the well known book, *The Foundations of Nutrition*, by Mary Swartz Rose, Macmillan, "written for those who wish to live more intelligently." Two books by H. C. Sherman came to hand during the year. *Food Products*, Macmillan, is a 3rd edition so completely rewritten as to be practically a new book. It gives in appendices the Food and Drugs Acts, meat inspection and regulation, mineral content of foods, and vitamins in foods. The second is an entirely new book, *Food and Health*, Macmillan. Needless to say, all that Professor Sherman states is authoritative, and these two books with that by Mrs. Rose give all that the average reader could need on the subject.

Diet and the Teeth, by May Mellanby, His Majesty's Stationery Office, is Part III of a study which has

been intensively carried on for 17 years. This part is devoted especially to study on humans.

Food-Borne Infections and Intoxications, by F. W. Tanner, Twin City Printing Co., is an elaborate study of the subjects included in the title. It is of especial value to administrators, domestic science teachers and laboratory men, though all physicians are of necessity interested in the subject. In 1932, a book, *Alcohol and Man*, Macmillan, by 22 authors, was issued under the editorship of Haven Emerson. A smaller book, *Alcohol: Its Effects on Man*, by Haven Emerson, Appleton-Century, is designed for school teachers, high school and college students. Theoretically, prohibition having been repealed, it should be of more use than before.

A number of books on childhood and adolescence have appeared, among which we may mention *The Century Childhood Library*, edited by John E. Anderson, Appleton-Century. There are three volumes, all of which are good. *Healthy Childhood*, by Harold C. Stuart, Appleton-Century, 3rd volume of the series, can be recommended without reservation. It is in many ways the most complete book available on the physical aspects of child hygiene intended for lay readers. *The Road to Adolescence*, by Joseph Garland, Harvard University Press, "deserves wide reading. Helpful in making children of best material and fitting them for life in body and mind." An interesting study is *Idleness and the Health of a Neighborhood*, by Gwendolyn Hughes Berry, New York Association for Improving the Condition of the Poor. This is a social study of the Mulberry Street district, which substantiates the belief that unemployment affects injuriously the health. No correlation was found between unemployment and illness in preschool children. Other publications which will

prove useful and are considered outstanding by some specialists are: *Healthy Babies are Happy Babies*, by Josephine Hemenway Kenyon, Little, Brown; *The Child; His Origin, Development and Care*, by Florence Brown Sherbon, McGraw-Hill; and *Mental Hygiene of the School Child*, by Percival M. Symonds, Macmillan.

A number of books on practice have appeared. It is a temptation to review some of these, since in all contagious diseases, proper care is one of the safeguards against spread.

Miscellaneous: *The Modern Treatment of Syphilis*, by Joseph Earle Moore, Thomas, is an especially good book, which deals also with public health aspects. While we avoid books on treatment, we mention this because the treatment of syphilis is essentially a part of its control. *Contagious Diseases*, by W. W. Bauer, Knopf, is designed for lay readers. *La Lèpre*, by E. Jeanselme, Paris, G. Goin et cie, has not been translated as far as we are aware. It is the one book in a foreign language which we mention, and we are doing this on account of its importance. It should be in all libraries. *Nervous Breakdown*, by W. Beran, Farrar & Rinehart, is especially timely on account of the depression. It is an interesting treatment of a misunderstood subject, with prevention stressed. The Milroy Lectures for 1932, with additions, are presented in *Diphtheria; Past and Present*, by J. Graham Forbes, John Bale, sons & Danielsson. It is an excellent and voluminous treatise, and though the material is drawn chiefly from England, the facts are generally applicable. *The Eugenic Predicament*, by S. J. Holmes, Harcourt, Brace, is authoritative and interesting, but pessimistic. *The Teaching of Preventive Medicine in Europe*, by Carl Prausnitz, Oxford University Press, contains the Heath-Clark Lectures for 1932, based on personal observations and documents from the

Health Section of the League of Nations.

Two especially interesting books are *The Windows on Henry Street*, by Lillian Wald, Little, Brown; and *A Review of Public Health Realities*, Commonwealth Fund. The first is practically a continuation of Miss Wald's first book, *The House on Henry Street*, from 1915 to date. It is most interesting, and though not an autobiography, gives a good picture of Miss Wald and her remarkable work. The latter, by Dr. Chapin, might well have been put under history. It consists of 16 papers selected from 133 by him. Eight of these were given before the A.P.H.A. or published in its *Journal*. We need hardly add that Dr. Chapin is the outstanding city health officer of the United States, if not of the world. The issue of this book was a labor of love in honor of him.

Red Medicine, by Sir Arthur Newsholme and John Kingsbury, Doubleday-Doran, is the story of a trip taken during the summer by the authors. It has been severely criticised on the ground that neither of the authors spoke Russian, and they were shown what the Soviets wanted them to see. However, it is an interesting picture and well worth reading. Of *Chronic Illness in New York City*, by Mary C. Jarrett, Columbia University Press, Professor Boas says: "The first carefully considered review and interpretation of the many aspects of chronic disease, grounded on an adequate factual basis." It is a voluminous study and much of the material is generally applicable. *Blindness and the Blind in the United States*, by Harry Best, Macmillan, is a detailed and comprehensive study, considering among other things, prevention, and the provision made for the blind and their children. *The Physiological Effects of Radiant Energy*, by Henry Laurens, Chemical Catalogue Co., is a masterly and authoritative book, useful chiefly as a text, being too technical.

for the average reader. However, considering the various uses which are being made of radiant energy at the present time, and the necessary exposure of many workers to such influences, it is timely.

Somewhat apart from our subject is a most notable publication, the second edition of *Webster's Unabridged Dictionary*, a monumental work. For years Webster has been the standard of this *Journal* on spelling, pronunciation, usage and meaning of words. It is an indispensable aid to an editor or writer. It is published by G. & C. Merriam Co.

This year is the 150th anniversary of the founding of the publishing house now known as Lea & Febiger. During all these years it has remained in the hands of the descendants of Mathew Carey, its founder. For many years it has been exclusively a medical publishing house. In 1820, the journal now known as *The American Journal of the Medical Sciences*, was founded, "with one exception, the oldest medical periodical in the English language." Since 1859, it has been the publisher of *Gray's Anatomy*. Public health as well as medicine in general owes much to this house, which has always maintained the highest standards. The story of the house is told in *One Hundred and Fifty Years of Publishing, 1785-1935*, distributed free by Lea & Febiger, Philadelphia.

Industrial Maladies—By Sir Thomas Legge, Late H. M. Senior Medical Inspector of Factories and Medical Advisor to the Trades Union Congress. New York: Oxford University Press, 1934. 234 pp. Price, \$4.25.

Dr. Legge's final work was completed by his successor in the office of Medical Inspector of Factories, Dr. S. A. Henry, to whom he left the task of editing. Dr. Legge died on May 7, 1932, at the age of 69. Dr. Henry has prefaced

the book with several pages upon the biography, publications, chief attainments and connections of the author. These review the life of a well trained specialist (Oxford, St. Bartholomew's, and Cambridge) who was the first Senior Medical Inspector appointed, and who served in that capacity from 1898 to 1926.

In a methodical manner, the present work takes up the notification (reporting) of industrial disease and poisoning, followed by a chapter on compensation. Then follow in order chapters on industrial diseases caused by bacilli; poisoning by lead, phosphorus and mercury, arsenic, other metals or their compounds, benzene and its compounds, other organic compounds, and other fumes and gases. Industrial dermatoses and eczema, cancer due to pitch, tar, paraffin, and mineral oil, pulmonary disease due to dust, and other industrial diseases—particularly the neuroses, the special senses, and compressed-air-illness, complete the specific and technical discussion.

The final chapter is devoted to health and welfare conditions in factories and workshops, and the book ends with a list of the books and publications of the author (1893 and 1932), and an adequate index. There are 2 color plates, 11 excellent half-tones, 36 tables and 14 charts or graphs. Table 8 is a large infold giving the statistics of compensation from 1908 to 1931 inclusive, and arranged according to the list of 37 compensable afflictions now scheduled for the British Isles.

The reviewer has critically examined many sections of the work and is duly impressed with the vast amount of knowledge and practical experience contained, as well as with the feeling that he is reading a master. While most of the work narrates the author's own experiences and opinions, he has not been hesitant with acknowledgments to others, and citations, which are frequent,

occur at the bottom of the reading page—a decided advantage.

Dr. Legge's familiarity with German—and it should not be forgotten that it was he who translated Rambousek's *Industrial Poisoning* (1913)—brings this phase of Continental European progress to the fore.

Evidently parts of the book have been edited as dictated so that involved statements occasionally occur, as on pages 55 and 57. However, Dr. Henry must be credited with an excellent posthumous editing of a work the context of which he altered as little as possible.

No doubt the work will be found the most adequate for current interest of any from the author's pen and a chief authority under its title. While the total pages are but 234, the printing set-up is compact, albeit easy to read, and the different subjects are commensurably treated in a well bound, handy volume.

The terminology, while medical, is easily within the grasp of the intelligent lay reader and should place the work upon the shelves of industrial, official, and educational libraries, as well as with individuals in several professions where industrial maladies are involved.

EMERY R. HAYHURST

An Introduction to Sex Education
—By Winifred V. Richmond, Ph.D.
New York: Farrar & Rinehart.
312 pp. Price, \$2.50.

Dr. Richmond modestly entitles this book "An Introduction to Sex Education," but it offers a broad consideration of the subject as detailed in a series of lectures given to the nurses in the Training School of St. Elizabeths Hospital. The excellent content spreads far beyond the classroom and makes an appeal to the physician or general reader who is anxious to secure a summary of the biology, history, and psychology of sex.

Public health officials, as a rule, take comparatively little cognizance of sex save in terms of venereal diseases. They give little thought to the mental illnesses that are outgrowths of sexual ideas and practices. They spend little time in discussing the problems of masturbation or contraception. From their writings and enactments one would not learn that sex and public health have any common factors. There can be no doubt that the numerous sex problems of today preserve part of the continuity of man's development. Sex is and always has been regarded as a driving force involving erotic pleasure as well as biologic purpose, and dynamically determining vital statistics.

The author senses sex itself as a primary factor, entering at all ages into man's physical, social, and religious organization, although still requiring more careful data for scientific evaluation. Public health officials should begin to sense people in terms of what they are, what they do, and how they are influenced by psychological situations, attitudes, precepts and practices originating in or relating to the sexual impulse. Personality cannot be understood without an appreciation of what it derives from the basic sexual urge—public health cannot ignore the personality.

Public health officials should be particularly interested in the discussions of the problems of sex which involve, not merely fears, perversions and prostitution, but include the sexual factors that break down marriage, promote sterility, or are caught up in the numerous individual and social difficulties bound up in venereal diseases.

No public health official of the present day can deny, even though he ignore, the part that sex plays in the declining birth rate, the rising divorce rate, the spread of contraceptive information, and the establishment of birth control clinics, the emphasis upon a eugenic

program, the control of prostitution, the prophylaxis and control of venereal diseases, the increase of neuroses and psychoses in which sexual problems are involved.

While this book is not written from the standpoint of public health, its pages are crammed with public health implications which should be noted approvingly. The scientific approach to the broad problems of public health must recognize the sexual factor. A thoughtful perusal of this book should lead to more constructive thinking among public health officials—but will it?

IRA S. WILE

Food and Health—By Henry C. Sherman. *New York: Macmillan, 1934.* 296 pp. Price, \$2.50.

No well informed person asks why a book was written, if Sherman is the author, but an excerpt from the preface best explains the purpose of this particular one:

Because the writer, having devoted intensive and extensive study over a fairly long time to the sanitary, the economic, and the nutritional aspects of the food problem, believes that it is now possible to summarize the essentials of all three aspects in a sufficiently coordinated way to guide the reader to well balanced judgments in the daily choice and use of food

The main body of the book is a summary of the conclusions, as applied to man, that may be drawn from the more recent studies on nutrition. The topics considered may be classified under the four types of metabolism—energy, protein, mineral, and vitamins. The knowledge we have of these subjects was gained by innumerable individual studies, limited almost entirely to the experimental point of view. It is the task of *Food and Health* to correlate the conclusions that may be drawn from these studies so they may find immediate application in dietetic practice. In large measure the correlation is accomplished by the difficult task of quantita-

tive interpretation. As examples of the wide range of subject matter one may find height-weight tables; the number of calories that must be eliminated from the diet to reduce the weight by 1 pound per week; the daily protein requirement; the daily phosphorus requirement; the kind and amount of food required to supply the optimum amount of vitamin A. One of the important contributions of the author is the emphasis placed on the distinction between passable health and buoyant health, between absence of disease and positive health.

The appendices, pp. 207–259, will be exceedingly helpful to workers in various fields of human nutrition. These include: Nutritional Calories in Common Servings and Commercial Units of Typical Foods; Foods as Sources of Protein and Mineral Elements; Foods as Sources of Vitamins; Illustrative Records of Meals. Those interested in the original literature will find the Selected Bibliography very useful, and there is a carefully prepared index.

Another excerpt from the preface indicates the type of audience this book should reach:

We here attempt to show how the benefits of the newer knowledge may be had without either the restrictions or the fussiness that the term diet too often implies.

This audience might well include that section of the general public which is willing to read an informative book, and all those who have a personal or professional interest in public health.

There is so little in this book that could lead to controversy that the reviewer has some hesitancy in mentioning even one point on which there may be a difference of opinion:

It is partly for this reason that meat should be eaten sparingly, and when eaten should always be well chewed . . . in the hope that its putrefactive bacteria will be largely killed by the gastric juice.

The reviewer believes the average reader will interpret the word *sparingly* much more narrowly than would a representative group of even our most eminent physiologists.

The printing and make-up are excellent.

ALBERT G. HOGAN

Skin Deep: The Truth About Beauty Aids—Safe and Harmful—*By M. C. Phillips. New York: Vanguard Press, 1934. 254 pp. Price, \$2.00.*

No competent health official needs to be informed that much of the modern beauty business is a racket. Gullible women are and probably always will be the prey of mercenary vendors of costly and sometimes dangerous cosmetics, unguents, astringents, lotions, and other aromatic chemicals that are flamboyantly, extravagantly, and often erroneously advertised as positive aids to the attainment of female pulchritude.

This book purports to enlighten the public as to the true nature and the frequently insignificant manufacturing cost of many highly touted and expensive aids to human charm. On the whole, it accomplishes this commendable purpose, but like so much of the material emanating from Consumers' Research, the book tends to be more sensational than scientific, and it is written in the blatant and rather supercilious manner that seems to characterize all of the publications of this self-appointed and somewhat unreliable guardian of the welfare of the ultimate consumer.

In its various chapters, this book presents interesting and useful discussions of face powders and cold creams, hand lotions and so-called hair restorers and removers, lipsticks and rouge, deodorants and sunburn remedies, reducing nostrums and similar bunk. One chapter, devoted to diet, contains some weird alleged facts worthy of any faddist. It is unfortunate that such fatuous statements as that salads should be used

only occasionally, "*if at all*"; that there are hazards involved in the use of cod liver oil; that milk is over-rated as a food for adults; that glucose is an undesirable form of sugar; and that fruits have little value, should appear in any presumably reputable and authoritative text. Such poppycock is still poppycock, whether it occurs in advertising copy or between the covers of a book.

This treatise, boldly naming names, not only of falsely advertised and occasionally worthless preparations, but also of supposedly decent magazines that carry their advertising, will undoubtedly be popular, and deservedly so. Despite its defects, the book contains material of general interest and value. If it helps to bring about some reforms in trade practices, and aids in promoting better legal control of cosmetics, it will have served a useful purpose. The reader will do well, however, to omit the chapter on diet and turn to Sherman, Rose, McCollum, or some other real authority for authentic information on this important topic.

JAMES A. TOBEY

Clinical Laboratory Diagnosis—*By Pauline S. Dimmitt, Ph.G. Philadelphia: Davis, 1934. 156 pp. Price, \$2.00.*

This book is merely a running outline of the essential steps necessary in the performance of a wide variety of clinical laboratory tests. In fact, it is designed for the teaching of brief and probably inadequate courses in laboratory technic to internes and medical technicians. It fails to include any basic theoretical groundwork and proceeds entirely by rule of thumb. It will be found of little value to the worker in a public health laboratory since it is woefully weak in the exposition of those tests routinely applied in public health work.

EARLE K. BORMAN

The Life of Sir Robert Jones—By Frederick Watson. Baltimore: Wood, 1934. 318 pp. Price, \$3.75.

As with all men, the career of Robert Jones was the result of a combination of circumstances and personal qualities which had never occurred before and never will again. The account of his career, written by his son-in-law, reads like a romance and is, in fact, far more interesting than most of the fiction which is being put out at the present time.

Born in 1857, the son of a London journalist, Robert Jones was aided in getting a medical education by an uncle, Hugh Owen Thomas. Thomas was an eccentric genius, but an exceptionally well trained and successful orthopedist of Liverpool, the son of a celebrated bone-setter.

After his graduation in medicine, young Jones practised with Thomas for a time and then set out for himself. In 1888, at the age of 31, he was made Surgeon Superintendent of the Manchester Ship Canal, and put in charge of the health, surgical work, and hospitals required for the 20,000 laborers and their families located along the route of the canal during the 8 years of its construction. Here he gained invaluable experience, especially in emergency surgical work.

Jones was a rapid as well as a skillful operator. On the occasion of a visit to Liverpool by the American College of Surgeons in 1914, he carried out a program of 52 operations in the time ordinarily taken by Americans for 5. It was nothing unusual for him to see 250 patients in a day.

Dr. William Mayo said that Jones was one of the very greatest surgeons he had ever met. Lord Moynihan said:

As an operator he is among the greatest. His technic is flawless, yet simple. His movements show the closest familiarity with every detail of the structural and functional anatomy

of the part and are of the highest excellence in craftsmanship.

His manipulation of a limb might be a demonstration of the immense power which a man of great strength can apply almost ruthlessly when the occasion demands it, or of the most exquisitely gentle and tender caress when only a slight touch is needed. The most stubborn deformity seems by degrees to become subservient to his will, the most obstinate fracture slips nimbly into alignment.

Under Jones's care, cures resulted in a large number of cases which were formerly treated for months and years by orthopedic apparatus, often with unsatisfactory results. Although a skillful surgeon, he was loath to operate unless necessary. He advocated continued care and follow-up until the patient was cured, although this might take a long time. Jones shortened the time for the patients by providing technical occupations for them and substituting an air of cheerfulness in his hospitals for the atmosphere of despondency and gloom of earlier days.

At the outbreak of the World War, Jones placed his services at the disposal of his country and succeeded in obtaining a wide acceptance of his methods in the field and in the hospitals at home. Through his efforts many large special hospitals were established with the object of restoring injured limbs as far as possible and teaching the patients useful occupations suited to them. His contributions to his science place countless persons in his debt who never heard his name.

In later life the prevention as well as the cure of deformities in children claimed much of Jones's attention, and through his efforts centers for the examination and treatment of the youth of the land were established all over England. Rickets and tuberculosis being frequent causes of deformity, he became a crusader for better housing and purer milk supplies.

Jones fought valiantly for the ac-

ceptance of the principles and methods which he knew to be right. He wrote many articles and books, some of which were promptly recognized by the medical profession as marking an advance in the science of orthopedics and all of which were authoritative.

Honors came to him thick and fast. He was created a Major General, was knighted, and received recognition from a number of European institutions and governments. Yale, Harvard, McGill, and Smith conferred degrees upon him. From the United States he received the Distinguished Service Medal.

Death came to him at the age of 76. His remains lie in the cathedral at Liverpool.

GEORGE A. SOPER

Birth Control, Its Use and Misuse—

By Dorothy Dunbar Bromley. *New York: Harper, 1934.* 304 pp. Price, \$2.50.

Nothing better on the use and misuse of modern medical knowledge of contraceptive procedures has appeared in good English from the hand of any non-medical author.

Here we have accuracy and readability in a text addressed to the general public and free from cant, propaganda, or any form of intellectual dishonesty.

There is obvious sincerity of purpose, a thorough understanding of the subject, a gift at simple description, and a degree of common sense and decency in every chapter.

A topic, banned by federal law as obscene since 1873, taboo by religious edicts until recently, feared by physicians from lack of professional education in it, ignored by our health officers, made complex and costly by commercial charlatans, appears simple and clean in the words of this author.

The marvel is that legislators of states and the Nation can so long linger in the dark doubts of other generations in their official attitudes. Some generous social angel might illuminate their

minds by a gift of this book to the wife of each married legislator now in office..

It is certainly to be hoped that we may swiftly follow the example of England, Germany, Holland, and the Scandinavian countries, by including marriage counselling, or merely birth control advice, among the functions of maternal health centers of local health departments, with this little book as a sort of lay *vade mecum*.

HAVEN EMERSON

Handbook of Chemistry and Physics—*Compiled and edited by Norbert A. Lange, Ph.D. Sandusky, O.: Handbook Publishers, Inc., 1934.* 1265 pp. and an appendix of 248 pp. of mathematical talks and formulae.. Price, \$6.00.

This is the most complete chemical handbook which has as yet come to the attention of this reviewer. It should be of value as a source of chemical, physical, and mathematical data not only to the chemist and chemical engineer but also to the public health laboratory worker.

In addition to the usual tables of chemical and physical constants and factors there is included a wealth of information on subjects which are of interest to the worker in the field of public health. Among such material may be found tables on composition of foods, the vitamins, composition of milk, ice cream ingredients, milk solids, lactometer corrections, typical water analyses, drinking water standards, water softening formulae, and algae.

The list of trade names of chemicals with the corresponding synonyms and formulae and the table of hazardous chemicals, giving usual methods of shipping, storage, and common hazards are well worth mentioning.

The section devoted to hydrogen ion determinations is unusually complete. The arrangement of the table of gravimetric factors is a most practical one.

and the table of conversion factors shows not only a sensible alphabetic arrangement of units, but is unusual in its completeness. Considerable engineering information relating to heating, ventilating and hydraulics has been included. A list of definitions of pharmaceutical preparations and therapeutic terms has been added to the usual list of definitions of chemical terms.

To the worker without ready access to various chemical, physical, engineering, and mathematical tables this handbook is to be recommended.

CARYL C. CARSON

Swimming Bath Water Purification

—By *Wilkinson and Forty*. (2nd ed.) London: *Contractors' Record, Ltd.*, 1934. 262 pp. Price, \$3.75.

No American book compares favorably with this volume in covering its subject. The best British practice and objectives are seen, as condensed in this most practical exposition, to be so like ours that the book has a usefulness for operators, managements, and officials charged with sanitary supervision of our indoor and outdoor pools.

The cautious treatment of the relationship of pools to disease merits perusal. Sanitary expediencies and controls are emphasized throughout. Routine operating tests are fully explained and a good round basis for comprehending the full significance of each step of purification is made clear for the layman.

The workings are minutely described for not only the recirculation, filtration, and chlorination devices which are essentially standard for both countries, but descriptions are given of chloramine, ultra-violet ray, Electro-Katadyn, and automatic "Photochlortrol" chlorination equipment, also automatic "Chlortest" free chlorine tester, and commercial manual testing equipment for turbidity, free chlorine, and alkalinity.

Standards include the dictum that the bacteriological content of the water should approximate that of drinking water and that free chlorine should be maintained continuously between 0.2 and 0.5 p.p.m., preferably toward the higher limit, in which case there is normally no need of further routine testing. Chloramine sterilization is given prominence but no great emphasis is given to its slower action than chlorine. The reviewer is not ready to concur unreservedly in the statement that "There is now general agreement that the most efficient, convenient, and generally satisfactory method of continuous chlorination of re-circulated swimming bath water is by means of chlorine gas which is capable of being administered at an unvarying standard of strength and potency, *continuously*, in accurately dispensed quantity, and under *perfect* and instantaneous control" (Reviewer's italics). The incomplete concurrence arises from the desire not to discourage any promising development of application of hypochlorites.

The book is excellently printed and illustrated, with an abundance of diagrams and photographs of equipment.

CHARLES L. POOL

The Vitamin B Requirement of Man

—By *George R. Cowgill*. New Haven: *Yale University Press*, for *Yale Institute of Human Relations*, 1934. 261 pp. Price, \$4.00.

This is a scholarly report on extensive experimental, mathematical, and historical researches on vitamin B and beriberi, conducted by the author and his associates at Yale University during a decade.

Since beriberi is essentially a public health problem, this book, which clarifies the underlying issues and makes important contributions to the control of this disease, will be of particular interest to readers of this *Journal*. The

broad scope of this book is indicated by the following highly condensed chapter headings:

The problem; discussion of beriberi, its incidence in various countries and times; critique of animal experiments; experiments on pigeons, dogs, rats, mice; comparison of data yielded by different species; mathematical formulae relating vitamin requirements to body weight within species and between species with extrapolations to humans; the influence of energy metabolism (exercise, hyperthyroidism, etc.) on vitamin B needs; vitamin B contents and vitamin to energy ratios of different foods; comparisons of author's vitamin B units with published units and results; vitamin B content in diets not associated with beriberi; sex and age incidence of beriberi; explanation of association of beriberi with malaria and diarrheal conditions, with gastrointestinal and heart disorders, anorexia, anemia, etc.; summary; bibliography; index.

The tables giving amounts of vitamin B present in different foods and vitamin to calorie ratios and the historical and critical discussions of various dietaries in all parts of the world will be of practical value to public health workers, clinicians, dieticians, as well as to investigators in nutrition.

The author has quoted and carefully analyzed many dietaries from European, Asiatic, African, and American countries, and has given special attention to dietaries in war prison camps, jails, asylums, etc., where "institutional diseases" are often found. From his analyses of these data it appears that no matter how poor the diets are in other respects, beriberi will not appear unless the vitamin to calorie ratio falls below a certain critical level. This apparent constancy of vitamin to energy metabolism is, in the reviewer's opinion, the most important generalization of the book. The quoted data on the influence of exercise, fever (as in malaria), hyperthyroidism, etc., on the development of beriberi leave no doubt of the existence of an intimate relation between energy and vitamin B metabolism.

The author's equations are too com-

plicated for review. Their central idea is that vitamin B needs of *mature* animals of different species (mice, rats, pigeons, dogs, and apparently humans) increase with the $2/3$ power of body weight, so that one equation can represent the vitamin B requirements of all mature animals including humans. This equation is further generalized to include growing animals by multiplying the $2/3$ power equation

$$(\text{vitamin} = K(\text{weight})^{2/3})$$

by the ratio of given body weight to maximum (mature?) body weight. In this connection it may be pointed out that the reviewer, using the method of least squares, obtains somewhat different values for the exponent of the weight for the species studied than Cowgill's 1.66, namely, 2.27 for mice, 1.75 for rats, 1.74 for pigeons and 1.69 for dogs. However, the author was probably justified in employing the 1.66 value for purposes of generalization.

This book makes an important contribution to technic by pointing out that anorexia is usually the earliest symptom of vitamin B deficiency, and by using this symptom for measuring vitamin B deficiency in diets. This fact has wide clinical application, especially in the feeding of marasmic infants and convalescents from fevers. Readers of this *Journal* will be grateful for the careful organization of the available knowledge relating to vitamin B and its deficiency diseases by an original and fruitful investigator.

SAMUEL BRODY

Children of Preschool Age—By Ethel Kavin. Chicago: University of Chicago Press, 1934. 340 pp. Price, \$3.50.

This report from the Behavior Research Fund and Institute for Juvenile Research in Chicago gives the results of studies in socio-economic status, social adjustment, and mental ability, with illustrative cases. The descriptions of

the nursery school and clinical services are clearly presented. The book should be helpful to anyone contemplating nursery school development, as well as a useful reference for those attempting to develop research at the preschool age level within a service program.

IRA V. HISCOCK

Community Hygiene—By *Laurence B. Chenoweth, A.B., M.D., and Whitelaw Reid Morrison, A.M., M.D.* New York: F. S. Crofts & Co., 1934. 317 pp. Price, \$2.50.

This book represents a crystallization of lectures to college students, and emphasizes especially measures for the control of communicable diseases. The excellent illustrations form one of the best features, many representing Ohio conditions, which add interest to the descriptive text. Selected references are appended to each chapter as a guide for more extended reading in various subjects. A brief glossary contains definitions "somewhat simpler than those given in the medical dictionary."

In general, the chapters are well written and include practical discussions of various aspects of preventive medicine and public health administration. One may wish that the definition of pasteurization were in accord with modern practice, and that a more representative picture of city health administration could have been given. But aside from a few details of this nature, the book has merit, and should prove to be a useful college text.

IRA V. HISCOCK

Microbiology and Elementary Pathology for the Use of Nurses—By *Charles G. Sinclair, M.D.* (2nd ed.) Philadelphia: Davis, 1934. 377 pp. Price, \$2.75.

In general the material presented is in good form, good diction, and well organized, but entirely too ambitious for the general garden-run of nurses.

This probably is not a legitimate criticism because there is always a question of what a nurse should be taught to make her a competent aid to the physician, and not his competitor. The more one sees of the training to which nurses are exposed the more he obtains the impression of inadequacy of that training.

While burdening the nurse with such things as the establishment of pébrine as a germ disease, too little emphasis is laid on the preparation of hands of operators and nurses and the site of the operation. The need, if not necessity, of running water for general cleansing is not mentioned.

There are a number of questionable terms and statements used, several improper statements and misleading impressions given, which markedly detract from the scientific value of the book; for example:

"Bacteria grow without the aid of chlorophyll"; "Ciliated epithelium which covers the bronchi"; "Thermal death point of bacteria of 65 to 70° C." (Time element and type of heat not mentioned); "Simple stains are merely weak *alcoholic* solutions of aniline *basic* dyes"; "Specimens." "Pus . . . may be . . . inoculated on to glass slides"; "The laboratory diagnosis of diphtheria includes bacteriological diagnosis . . . virulence tests, . . . and the Schick test"; "The war"; "Bacillus botulinus is found in fruits and vegetables"; "Overproduction of the parathyroid, (*hyperthyroidism*) will raise the serum calcium level"; "The beef tape worm has segments . . . 5 centimeters broad"; "Blood smears made by thinly *smearing* the drop of blood over a slide"; "Absence of insulin (as in diabetes)."

It is stated that the Widal test is of little value when the serum is from patients previously immunized against organisms of the typhoid group. This is far from true if the test is repeated at 3-5 day intervals, when by a stationary or changing curve the most valuable interpretation to be had by this method is shown. The agglutination titer progressively rises during the

activity of the typhoid or paratyphoid fever, irrespective of previous immunization. Diphtheria of wounds is not mentioned. Under the title, "Laboratory Diagnosis of Bacillary Dysentery," occurs the dangerous statement, "The laboratory may aid in the diagnosis of bacillary dysentery by a microscopic study of the cytology of the feces—the number and kinds of tissue, pus and blood cells there." In the discussion on immunity much is made of the use of the toxins in prophylactic immunization against scarlet fever. The wide usage credited to this procedure is questioned.

Under the causes of hypoglycemia, no mention is made of that occurring under excess of body prepared insulin as seen in some tumors of the islet cells of the pancreas. In the chapter on tumors occurs a statement that no student of oncology would accept: "There are forms of tumors *midway* between the sarcomas and the benign connective tissue tumors to which a combined name is given: fibrosarcomata, chondrosarcomata, osteosarcomata." The combined names represent that these are sarcomas and of the type cell as designated. There is no midway station—tumors are either benign or malignant, and the combined terms as used represent malignant tumors derived from elements whose names appear in the terms.

The printing and make-up of the book are good. M. PINSON NEAL

Textbook of Materia Medica and Therapeutics—By A. S. Blumgarten, M.D. (6th ed.) New York: Macmillan, 1934. 791 pp. Price, \$3.00.

Too bad this text was not used in teaching Materia Medica when we were student nurses. We would have been saved much confusion and despair. The author states that most texts on this subject are too technical, and we agree. Here is a physician who is a real teacher. He knows that a little

knowledge of normal physiology is necessary for an understanding of the drug presented. He knows that the effect of a drug is principally the thing a nurse should know about it, and the site of action is of secondary importance; what a drug does rather than where it does it.

He even begins with drugs that have simple actions which a nurse can easily understand, then goes on to those that stimulate gastric juice, then cathartics, then drugs which act upon the blood, etc., ending up with drugs acting on the nervous system.

In my opinion the text is far the best in its field on the market. The two nursing schools we have visited since receiving the book to review were using it as a text, and it is probably safe to say that it is more widely used than any other. It is to be recommended without reservations.

EVA F. MACDOUGALL

Text-Book of Meat Inspection—By Robert V. Ostertag. Chicago: Alex Eger, 1934. Price, \$10.00.

This is an entirely new book superseding and replacing the classic, *Ostertag's Handbook of Meat Inspection*. In his Preface, Professor Ostertag points to the success of his *Handbook*, which has gone through 9 editions in German and 4 in English, and explains his reasons for writing a new book instead of issuing a new edition of the old one. He felt that the textbook could be made more concise and give more attention to essentials, making it more useful to veterinarians. He holds that the value of the *Handbook* as a source of material remains unimpaired. The English editor, with the permission of the author, has reduced the size of the book by cutting out portions of the German edition, chiefly history, German legislation and German references. He has also added a chapter on poultry.

It is hard to speak too highly of this

work. Professor Ostertag has for many years been recognized as the greatest veterinary authority on meat inspection, and there are few people in any country capable of criticising his work. The book before us goes into the usual subjects found in a book on meat inspection, and gives an especially thorough description of the physiological conditions which are important. There is a chapter discussing the General Pathology of Slaughtered Animals Relating to Sanitary Science. Other chapters discuss Regional Diseases; Blood Anomalies; Intoxications and Auto-Intoxications; Animal Parasites; and Infective Diseases. A chapter is devoted to the use of agglutinants in sausage, the adulteration of meat, coloring and inflation.

There are a good index, and 12 appendices, a number of which are devoted to the laws and regulations in force in England. These concern slaughter, slaughter houses, food regulations, definitions of such terms as "cattle," "meat," "animal," etc.; General Observations for the Guidance of Inspectors and Butchers; Meat marking, Shops, Stores, Stalls, etc.; the use of preservatives, dyes, samples for analysis, and various other matters. Appendix XII is devoted to Regulations Governing the Meat Inspection of the United States Department of Agriculture. It will be seen that the book as issued in this country and England is especially designed to meet the uses of English and American veterinarians and food inspectors. The chapter on Animal

parasites occupies 80 pages, and that on Vegetable Parasites, really a treatise on infectious diseases, 203 pages.

The book is well printed and bound. The illustrations are abundant and good, many of them being in colors. The reproductions of the plates are excellent. This book can be recommended without reservation. While intended chiefly for the veterinary profession it is a standard reference for health officers and all engaged in the handling and inspection of foods. There can be no doubt that it will have a success comparable to the author's *Handbook of Meat Inspection*.

MAZÛCK P. RAVENEL.

The Mother's Encyclopedia—Compiled and Edited by the Editors of the Parents' Magazine. New York: Reynal & Hitchcock, 1934. 959 pp. Price, \$3.00.

On first thought one would hardly turn to an encyclopedia to learn how to bring up a child; but really in this instance the editors have done a pretty good job.

The subject matter consists of short articles by 130 authors (if my count is correct), many of them of national reputation. The unavoidable lack of continuity is balanced by the excellent system of cross references, a full subject index, and a table of contents grouped by age interest. The articles themselves are arranged alphabetically according to subject. Lesser but real advantages are good paper and type and flat opening. MERRILL E. CHAMPION

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Conserving Drinking Water—Inaugurating a series of abstracts of the report of the Water Planning Committee of the National Resources Board, this article presents an interesting picture of the meteorological conditions of the United States including a pictorial representation of the depths of mean annual precipitation.

BRUSH, W. W. Controlling Water Resources. *Water Works Engineering*, 88, 3:115 (Feb. 6), 1935.

Over a Century of Urban Tuberculosis History—An interesting and valuable review of tuberculosis mortality in American cities, and the social, economic and public health changes which probably influenced the course of that disease.

COLINSON, J. The Trend of Tuberculosis Mortality in Baltimore and Eight Other Cities, 1812-1932. *South. M. J.* 27, 12:992-1002 (Dec.), 1934.

Tuberculous Infection and Immunity—Epidemiologic evidence is presented which leads this Welsh author to conclude that relative immunity is acquired by mild tuberculous infection, though principally in those racial stocks long tuberculinized. It is pointed out editorially in the same issue that this conclusion is not in accord with the opinions of some American writers who now feel that tuberculin sensitization may well be regarded as a two-edged sword.

CUMMINS, S. L. Contact With Infection in Tuberculosis. *Canad. Pub. Health J.* 26, 1:1 (Jan.), 1935.

For Pension Planners—About 17 per cent of the population is over age 50; and 5.4 per cent over age 65. In 1920 only 4.7 per cent fell into this latter

class. The population is rapidly aging. Some of the New England States have nearly 9 per cent over age 65.

CUMULATIVE AGE GROUPS, BY STATES, FOR THE POPULATION 45 YEARS OLD AND OVER. Bureau of the Census. Washington (Dec. 28), 1934. (A distribution by color, age, and sex was issued Nov. 20, 1934.)

Fluorides and Teeth—From studies in West Texas, it now appears that cattle, too, may develop mottled tooth enamel when water rich in fluorides is used for drinking.

DEAN, H. T. Mottled Enamel in Cattle. *Pub. Health Rep.* 50, 7:206 (Feb. 15), 1935.

While Colds Go Merrily On—The conclusion that no specific measure has as yet been shown to be of sufficient value, for the prevention of colds to justify its indiscriminate use, though general measures carefully carried out seem effective in reducing colds among "cold susceptible" groups, follow logically, if not hopefully, upon this review of the present-day status of cold prevention and treatment.

DIEHL, H. S. The Common Cold. *New York State J. Med.* 35, 3:109 (Feb. 1), 1935.

In the Cause of Social Hygiene—Summarizing the reports of social hygiene activities of official agencies and voluntary groups in the 48 states in 1934, the picture presented is encouraging in certain respects. Though suffering from limitations of funds, a surprising number of agencies are doing business as usual.

EDWARDS, M. S., and PINNEY, J. B. Notes on the American Social Hygiene Scene 1934. *J. Social Hyg.* 21, 2:49 (Feb.), 1935.

For Improving on Ward Statistics—A highly practical manual on ar-

ranging for permanent statistical areas within cities, to insure continuity of data in spite of ward changes. Very timely in the light of the possible federal census in 1935.

GREEN, H. W., and TRUESDELL, L. E. Census Tracts in American Cities. Bureau of the Census. Washington (Dec.), 1934.

In One of the Wealthy Counties—Under the aegis of the County Medical Society and the Parent-Teacher Association, a scheme to examine children aged 2 to 5 was undertaken in Westchester County (N. Y.). Almost all of the 1,000 children examined needed medical attention. Only a few had been immunized against diphtheria or tuberculin tested; nearly a quarter had knock-knees and weak feet; and many behavior abnormalities were found.

HALL, F. Westchester County Child Health Examination Program. New York State J. Med. 35, 4:172 (Feb. 15), 1935.

The Price of Future Progress—How the status of public health administration may be restored at least to the position it held before the depression is the topic of this discussion addressed directly to voluntary health organizations, but with implications for all leaders in public hygiene.

HISCOCK, I. V. Rehabilitation of Health Work in the United States. Yale J. Biology & Med. 6, 6:1 (July), 1934.

Protection against Poliomyelitis—Twenty-five children were vaccinated with a ricinoleated poliomyelitis vaccine. None showed any ill effects and all showed an increase in antibody in the blood after vaccination. The authors feel they have a suitable vaccine for use particularly during epidemics.

KOLMER, J. A. *et al.* A Successful Method for Vaccination Against Acute Anterior Poliomyelitis. J.A.M.A. 104, 6:456 (Feb. 9), 1935.

Biting Flies from Sewage Filters—In the trickling filter bed of a South

Carolina Sewage treatment plant, stable flies were found breeding in great numbers. Flooding the filters twice a week for 12 hours solved the nuisance problem without damaging the nitrifying bacteria.

NETTLES, W. C. Checking an Outbreak of Stable Flies at Sewage Plant. Munic. San. 6, 2:36 (Feb.), 1935.

The Significance of the Colon-aerogenes Group—In stored feces, typical *B. coli* tended to disappear and were replaced by intermediate types, and then by typical aerogenes group. However, in some specimens, typical *B. coli* remained for a long period. The assumption that organisms of the aerogenes type, isolated from water supplies, come from grains or soils, and not from feces, is untenable.

PARR, L. W. Sanitary Significance of the Succession of Colon-aerogenes Organisms in Feces. Proc. Soc. Exper. Biol. & Med. 32, 4:580 (Jan.), 1935.

Amebic Dysentery and Food Handlers—Research is described which indicates that carriers of amebic dysentery do not frequently contaminate their hands with viable organisms under ordinary conditions. From this it is concluded that contamination of food by food handlers must occur infrequently.

SPECTOR, B. K., *et al.* Endamoeba Histolytica in Washings from the Hands and Finger Nails of Infected Persons. Pub. Health Rep. 50, 6:163 (Feb. 8), 1935.

What Staphylococci Are Implicated in Food Poisoning?—The question whether staphylococci causing food poisoning constitute a peculiar group must be answered in the negative, so long as our present differential methods remain with existing limitations, is the finding of this research.

STRITAR, J., and JORDAN, E. O. Is a Special Variety of Staphylococcus Concerned in Food Poisoning? J. Infect. Dis. 56, 1:1 (Jan.-Feb.), 1935.

Our Maternal Mortality is Excessive—About 1,000 certificates involving maternal deaths were sent to 16 foreign countries for classification. The differences in method of classification were found insufficient to account for the relatively high maternal mortality rate in the United States.

TANDY, E. C. Comparability of Maternal Mortality Rates in the United States and Certain Foreign Countries. Children's Bureau. Washington. Bureau Pub. No. 229, 1935. 5 cents.

Results of Sanatorium Care—The follow-up of 2,000 patients discharged from tuberculosis sanatoria finds half

returned to work and leads to the conclusion that results of sanatorium care are encouraging.

WHERRETT, G. J. Follow-Up Information on 2,031 Tuberculosis Patients One to Thirteen Years After Discharge from Sanatoria. Am. Rev. Tuberc. 31, 1:62 (Jan.), 1935.

Vitamin D Milk—Some rachitic infants were fed irradiated milk, others milk from yeast-fed cows. There was no indication of any difference between the two milks in their antirachitic effectiveness.

WYMAN, E. T., *et al.* A Comparison of "Yeast Milk" and Irradiated Milk in the Treatment of Infantile Rickets. New Eng. J. Med. 212, 6:257 (Feb. 7), 1935.

BOOKS RECEIVED

A TEXTBOOK OF NURSING TECHNIQUE. 2nd ed. By Marion L. Vannier and Barbara A. Thompson. Minneapolis: University of Minnesota Press, 1935. 265 pp. Price, \$2.50.

MAKING OUR MINDS BEHAVE. By William S. Walsh. New York: Dutton, 1935. 269 pp. Price, \$2.50.

VITALITY. By Boris Sokoloff. New York: Dutton, 1934. 183 pp. Price, \$2.00.

COMMUNICABLE DISEASES FOR NURSES. 3rd ed. By A. G. Bower and E. B. Pilant. Philadelphia: Saunders, 1935. 420 pp. Price, \$3.00.

MOUTH INFECTION. Clinical Histories. By Oliver T. Osborne. New Haven: Author, 1934. 119 pp. Price, \$2.00.

ELEMENTARY HUMAN ANATOMY. Based on Laboratory Studies. By Katharine Sibley. New York: Barnes, 1935. 380 pp. Price, \$4.50.

PSYCHOLOGY AND HEALTH. By H. Banister. New York: Macmillan, 1935. 256 pp. Price, \$2.50.

GROWTH AND DEVELOPMENT OF THE YOUNG CHILD. 2nd ed. By Winifred Rand, Mary E. Sweeny and E. Lee Vincent. Philadelphia: Saunders, 1934. 429 pp. Price, \$2.75.

NUTRITION AND PHYSICAL FITNESS. 2nd ed. By L. Jean Bogert. Philadelphia: Saunders, 1935. 566 pp. Price, \$3.00.

THE ART OF PUBLIC HEALTH NURSING. By Edith S. Bryan. Philadelphia: Saunders, 1935. 296 pp.

SURGICAL DISEASES OF THE CHEST. By Evarts Ambrose Graham, Jacob Jesse Singer and Harry C. Ballou. Philadelphia: Lea & Febiger, 1935. 1070 pp.

HEALTH DENTISTRY FOR THE COMMUNITY. By The Committee on Community Dental Service of the New York Tuberculosis and Health Association. Chicago: University of Chicago Press, 1935. 85 pp. Price, \$1.00.

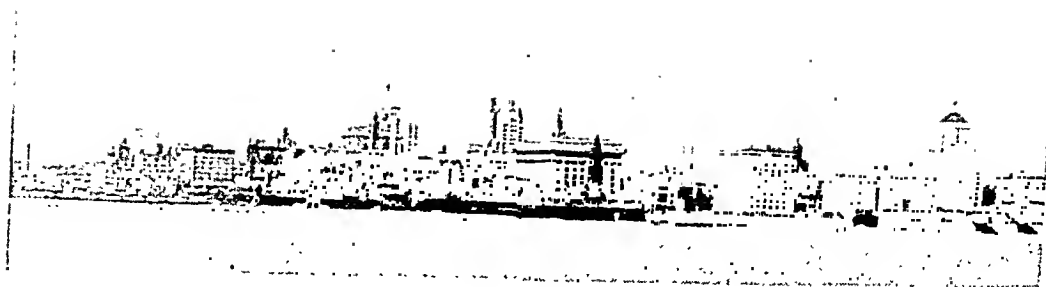
SING SING DOCTOR. By Amos O. Squire. Garden City: Doubleday, Doran, 1935. 296 pp. Price, \$2.50.

HYGIENE AND SANITATION. 3rd ed. By Jesse Feiring Williams. Philadelphia: Saunders, 1935. 372 pp. Price, \$2.00.

PRINCIPLES OF GENETICS AND EUGENICS. By Nathan Fasten. Boston: Ginn, 1935. 407 pp. Price, \$2.80.

GUIDING THE CHILD THROUGH THE FORMATIVE YEARS FROM BIRTH TO AGE OF FIVE. By Winifred de Kok. New York: Emerson Books, 1935. 191 pp. Price, \$2.00.

CONSERVING THE SIGHT OF SCHOOL CHILDREN. A Program for Public Schools. Report of the Joint Committee on Health Problems in Education. New York: National Society for the Prevention of Blindness, 1935. 54 pp. Price, \$35.



Skyline of Milwaukee

MILWAUKEE—OUR 1935 CONVENTION CITY

ON to Milwaukee and the Sixty-fourth Annual Meeting, October 7 to 10, 1935.

Magnetic Milwaukee, nestled in a broad expanse of bay, a part of Lake Michigan, one of the chain of lakes which holds half of the fresh water of the world, possesses a charm that has made it a successful convention city.

Milwaukee's recognition as a famous gathering place and as a center of genuine hospitality can be traced back through generations of red-skinned braves. Indian legend tells us that the name Milwaukee was first uttered as a naïve guttural cry of an Indian warrior as "Mahn-a-waukie" as he drew his bark canoe from the waters at the present site of the city. This name in the Ojibwa language means "good and beautiful lands." In different dialects other Indians are known to have called this spot "Mahn-a-waukie Seepe" or translated "gathering place by the rivers."

Shortly after the first Indian came to Milwaukee more and more tribes followed. They answered a beckoning message on the shores of Lake Michigan—a signal fire with a lone column of smoke, a bronzed figure standing nearby waving a blanket—this, the recognized Indian symbol for hospitality

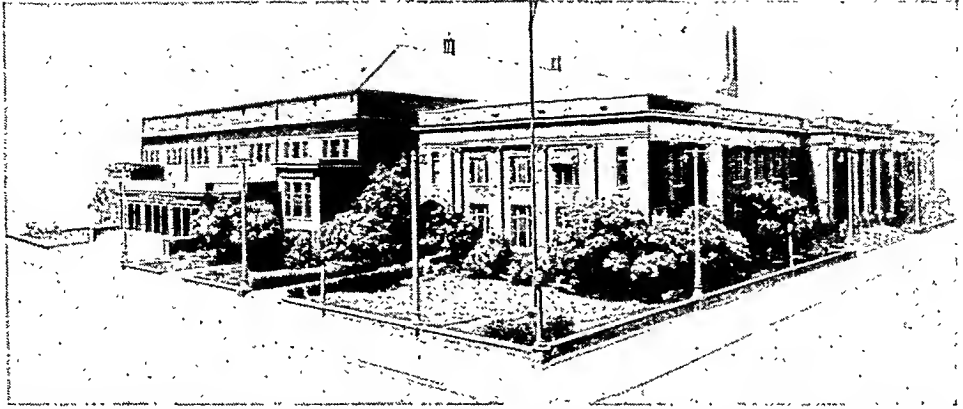
and friendliness served to draw the warriors to a natural meeting place.

Soon this early Milwaukee was a village of tepees; a village inhabited by warriors who had buried their warring hatchets, washed the war paint from their faces and lived in peace and contentment where the three rivers—the Milwaukee, Menominee, the Kinnickinnic—brought the beaver, muskrat, the mink, and the otter to the waiting traps of Milwaukee's first residents.

Today, Milwaukee is the metropolis of Wisconsin, the twelfth most populous city in the United States. In the last decade its population has increased 121,000 and Milwaukee County, in its 141 square miles, has a population of 725,263.

The same spirit of friendliness and hospitality is common today among Milwaukeeans. Today there are no signal fires, nor bronzed figures, but in place of these there are thousands of smoke stacks of industry and many buildings towering into the sky with flags unfurled—symbolizing a great city with a great spirit.

Some two hundred years ago, Pere Marquette and Louis Joliet, on the way to the discovery of the Mississippi River, passed along the west coast of Lake Michigan and marked the site of



The Milwaukee Auditorium is located in the center of the hotel, theatre, and shopping district and is one of the most complete and serviceable buildings of its kind in America.

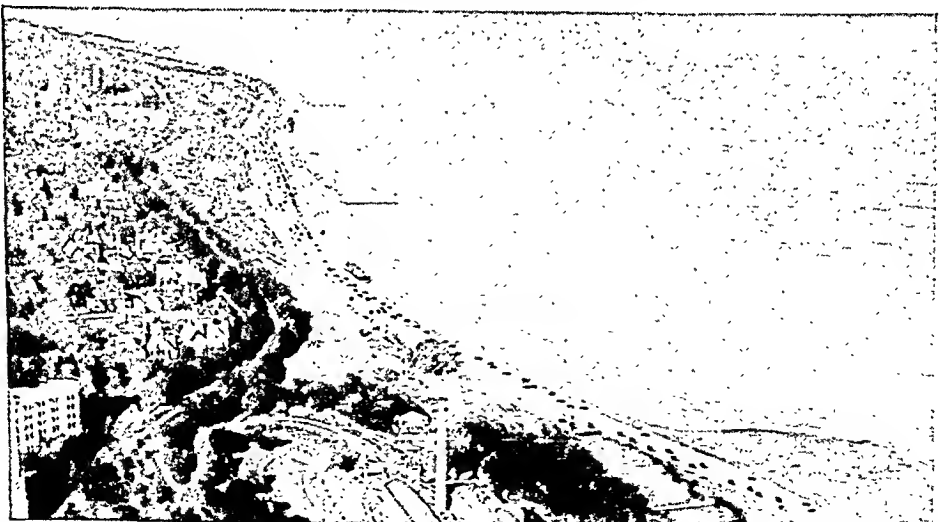
Milwaukee on their map. This map bearing the name of Milwaukee Bay is now in the possession of a convent in Montreal.

With the coming of the white man the Indian village grew into a thriving trading post, its strategic location giving it importance in the primitive commerce. In 1795 Jacques Vieau established a trading post for the Northwestern Fur Company.

Milwaukee traces its development as a city to the time when Solomon Juneau

purchased a small trading post from his father-in-law, Vieau, in an Indian village in the year 1818. Other pioneers banded together under the leadership of Juneau and were quick to capitalize on the advantages of the village's location for the development of industry and commerce.

The pioneers of Milwaukee, like their contemporaries in other sections of America, were generally able to handle their work unaided. But they joined together in the general spirit of coöpera-



The Lincoln Memorial Drive which stretches from downtown Milwaukee along the lake to the fashionable east side residential section follows Lake Michigan's edge through many parks and beaches. This view shows Water Tower Park and the Bradford Beach Pumping Station.

tion and worked for the combined interests and welfare of their neighbors, and thus the village prospered.

Along in the middle 30's Milwaukee suffered from an era of speculation, due to the high enthusiasm about all manner of public improvements. Roads were ordered and charters were granted to railroads. This was a little rash and prices mounted and real estate suffered. However, such men as Solomon Juneau made good on the pledges they had made and prices were soon restored to fair value.

Rival settlements known as Milwaukee East Side and Milwaukee West Side, popularly called Juneau Town and Kilbourn Town, were separately incorporated as townships of Milwaukee County in 1837. Two years later they were united as wards of the same village, each one keeping complete administration records of its own. Walker's Point on the south side of the city, was annexed as a third ward, and in 1846, the three were incorporated as the city of Milwaukee, and Solomon Juneau was elected the first mayor.

The first newspaper, the *Milwaukee Advertiser*, began publication on July 14, 1836, and a public school was also opened in that year.

In 1839, the Fire and Marine Insurance Bank was established. This bank for 40 years was one of the strongest banking houses west of the Alleghanies. Its notes passed at par through the panics when even government issues depreciated. It financed the Milwaukee Railroad and other railways.

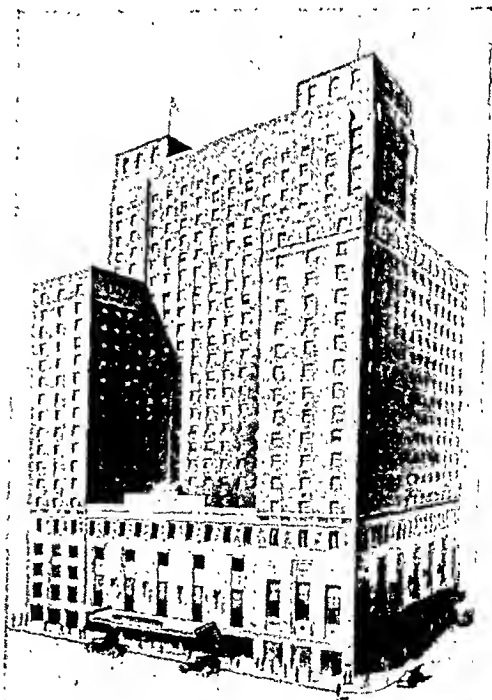
The first connection with Chicago by Telegraph was established in 1849; by railway in 1856. About 1840 a stream of immigration from Germany began, which was accelerated by the revolutionary movement in 1848, and continued through half a century.

In 1900 out of a total population of 285,315, the number born in Germany was 53,854; 151,045 more had one or

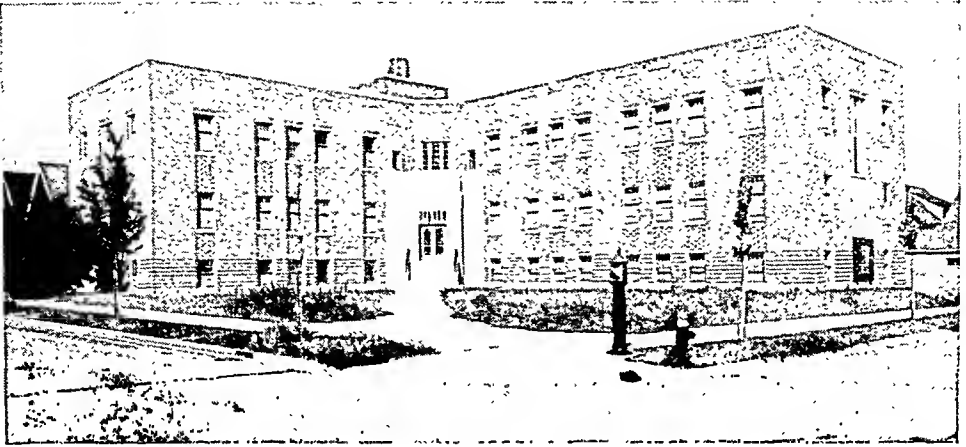
both parents of German birth. This made a total of 75 per cent who were either German by birth or of the first generation.

Its traditions are rich—its people are hospitable, yet it enjoys even greater advantages as a convention city. It is easy to get to Milwaukee for it is central to the northern part of the United States. Conventions held here impose surprisingly low travel burdens upon entire delegations, for it is said that more convention-going people live within a day's ride of Milwaukee than any other city in the United States, with possibly several exceptions.

Come to Milwaukee by an overnight train ride or less; by motorcar over a network of fine hard-surfaced highways; by steamship over Lake Michigan which affords automobile transportation and overnight service; by airplane over Lake Michigan, or overland and arrive at a modern municipal airport only 3 miles from downtown Milwaukee.



Convention Headquarters: Schroeder Hotel



Matthew Keenan Health Center, Milwaukee, Wis.

You will enjoy Milwaukee! We view it as a bustling workshop—one of America's greatest production centers. With this scene of great activity and industrial progress, Milwaukee has maintained its pleasing picturesqueness which through years has endeared it to visitor and dweller alike.

Nature has provided a beautiful setting, and Milwaukee citizens, while building up large and diversified industries have not been insensible to the appeal of beauty.

The Milwaukee River flowing through the heart of the business district gives to the city a graceful charm. Its waters teem with commercial crafts; its banks are lined with industrial plants; picturesque bridges span this stream and atone in whatever measure necessary for the ravages of commerce.

Delegates and visitors to this Sixty-fourth Annual Meeting will enjoy the farsightedness of Milwaukeeans who planned Milwaukee's business area. You will like especially the way in which the hotels, theaters, restaurants, stores, and Auditorium are all situated conveniently to each other.

Milwaukee has many parks and playgrounds scattered throughout the city covering an area of more than 1,500 acres. These parks offer a variety of interesting scenery and recreation. The

city is also circled by a park development plan which follows the lake shore, and the courses of the rivers and a wide concrete driveway extends along 5 miles of the lake shore from Juneau Park in downtown Milwaukee to Lake Park near the north limits.

It is a city of homes and home-loving, pleasant folk. Beautiful residential districts in all parts of the city bear evidence to this fact.

Milwaukee, with its natural advantages for commerce, has arisen rapidly as an industrial center. Today it ranks first in more than 20 important lines of manufacturing in the United States. It is one of the largest steel casting centers and has turned out some of the largest steel and gray iron castings made in the United States; has some of the largest machinery construction shops in the world; has turned out large Diesel engines, the largest gas engines; has the largest and best equipped plant for the manufacture of electric traveling cranes and hoists in the United States.

Added to this we find large plants for the manufacture of mine hoists, cars, gears and controls, refrigeration machinery, enameling, boat motors, lumber, motorcycles, leather and shoes, food products and beer.

There is nothing more pleasing to Milwaukee visitors than the beautiful

Lincoln Memorial Drive which follows the shore line of Lake Michigan for a course of 6 miles through a series of parks and beaches, the Milwaukee Yacht Club, the Coast-guard Station, Milwaukee Gun Club and terminating in the wooded and ravined Lake Park.

The Milwaukee Yacht Club, nestling in a cove of the harbor, adds a picturesque to the lake front with its sailing vessels, motor boats and races and water sports.

Washington Park, on the far west side of the city, contains the zoo, one of the country's largest, and the only one which has successfully bred and raised polar bears. Mitchell Park on the south side is famous for its gorgeous conservatory and exquisite sunken gardens.

Another show place in Milwaukee is its fine museum and public library, housed under one roof in a handsome building near the Court of Honor. The museum is noted particularly for its early American characterizations, and its collection of Indian articles. The Layton Art Gallery and the Milwaukee Art Institute located at North Jefferson and East Mason Streets have very fine permanent collections.

As an educational center Milwaukee is proud of its schools and colleges. Marquette University welcomes students from all over the world. In addition to its graduate school and high school, special courses in liberal arts, journalism, business administration, law, den-

tistry, engineering, medicine, and music may be followed.

The Vocational School is one of the foremost of its type in the world. It enrolls 35,000 persons and has a faculty of 269. There are 70 different courses for boys and men and 35 for girls.

Then there is Milwaukee Downer College, an accredited women's college, offering degrees of B.A., B.Sc., and special courses for women, as well as the Extension Department of the University of Wisconsin providing instruction for 3,500 students.

Occupying an entire block in the downtown area is the new 10 million dollar Court House as an example of modernity. It is one of the buildings of a proposed civic center.

Make your plans now to be present at the Milwaukee convention—October 7 to 10. You will enjoy the inspiration that always comes from an annual reunion, and the splendid impulses that arise from attending sessions. The Local Committee is busying itself planning a meeting which will be a worthy addition to your store of memories.

And, today, this great metropolis invites you as did the friendly braves of the Ouisconsin village of long ago to sit by her council fires and smoke the pipe of peace—to enjoy the hospitality of this friendly city. You cannot fail to enjoy this land of beautiful scenery and pleasant climate that also is so rich in legendary and historic interest.

The Royal Institute of Hygiene

THE Executive Secretary of the American Public Health Association has been authorized to appoint a member or Fellow of the Association as a representative at the Royal Institute of Hygiene in England, June 4 to

9. Dr. Atwater will appreciate it if anyone who expects to be in England at this time will get in touch with him at the Association office, 50 West 50th Street, New York, N. Y.

ASSOCIATION NEWS

ORGANIZATIONS MEETING WITH THE A.P.H.A. IN MILWAUKEE

The following organizations will meet simultaneously with the American Public Health Association in Milwaukee, October 7-10.

American Association of School Physicians
International Association of Dairy and Milk Inspectors
Conference of State Sanitary Engineers
International Society of Medical Officers of Health
Association of Dairy, Food and Drug Officials
Conference of Wisconsin Health Officers
Conference of State Laboratory Directors
Association of Women in Public Health

The preliminary program plans include special sessions on The Rôle of a

Health Department in a Program of Social Security, Mental Hygiene, Professional Education, Veterinary Public Health, Diphtheria Immunization, and a session upon the history and achievements of the Association's Committee on Administrative Practice, celebrating its 15th anniversary.

The Fourth Health Education Institute will be held October 4, 5, and 6, prior to the opening of the several conventions. The subject will be "Health Education in Small Cities and Rural Communities."

VITAL STATISTICS COUNCIL MEETS

A MEETING of the Council of the Vital Statistics Section was held February 3, in New York, with the following members present: G. E. Harmon, M.D., *Chairman*, Jessamine Whitney, George H. Van Buren, T. F. Murphy, M.D., John O. Spain, John Collinson, M.D., and A. W. Hedrich, Sc.D., *Secretary*. The following business was transacted:

The Committee on Confidential Inquiry on Causes of Death was continued. Dr. G. E. Harmon is to be chairman and Marjorie Bellows, who, with Dr. Matthias Nicoll has been conducting a survey on this subject in Westchester County, was appointed Secretary. For the next report of the committee, the following subjects have been suggested: (1) relative value of various methods of confidential inquiry; (2) change in death rates effected through confidential inquiry under titles other than the two discussed in the first report; (3) ways and means of extending confidential inquiry to other areas.

Discussion of the future of the Committee on Accident Statistics was deferred until the annual meeting.

A Committee on Standard Tables was authorized with Dr. John Collinson as chairman.

The Committee on Forms and Methods of Statistical Practice was authorized to take steps looking toward a joint committee with the Epidemiology Section for investigating the desirability and feasibility of differentiating, in certain reports, between varieties of the same disease; for example, major and minor smallpox.

It was voted to revise the "Rules for Statistical Practice" adopted in past years by the Section. Dr. T. F. Murphy was appointed committee chairman, with power to add.

It was voted to promote coördination between committees of the Section and those of the Association of State Registration Executives, by giving representation on Section committees to the chairmen or other suitable members of the Registrars' committees. As an ad-

ditional help in coördinating activities and promoting friendly relations it was voted to invite the president of the Registrars, Dr. Stewart Thompson, to become an Advisory Member of the Council of the Vital Statistics Section.

It was voted not to approve the resolution adopted by the Arizona Public Health Association calling for allocation of tuberculosis deaths to the place of origin of the disease, that objective, however desirable, being impracticable as routine procedure. It was felt that such allocation should be a matter of local study. Allocation to place of usual residence is, however, to be commended.

A resolution was adopted favoring a 1935 federal census (see editorial section). The Council also expressed its interest in the problem of promoting accuracy of intercensal estimates of populations for rural and the smaller intra-state areas, but no specific action was taken at this time.

It was voted to conduct a membership campaign, to have the following phases: (a) each member of the Council to bring in 5 new members; (b) section members, who travel extensively, to be requested to invite new memberships as occasion permits; (c) professional groups to be covered by members as follows: State registrars, Dr. Stewart Thompson; City registrars, Dr. G. E.

Harmon; Insurance workers, George H. Van Buren; Health associations, Jessamine Whitney; Universities and foundations, Dr. A. W. Hedrich.

George H. Van Buren was appointed chairman of the Committee on Membership.

It was agreed, subject to approval of the Central Office, to prepare and circulate a directory of persons engaged in the collection, publication, or analysis of vital statistics. The directory, it is hoped will prove useful for program and and committee appointments, as an incentive to membership, and as a source of information as to who is who in vital statistics.

An outline of Annual Meeting sessions was tentatively adopted. There is to be a session for (a) committee reports and Section business, (b) registration problems, (c) needs of the various types of consumers of vital statistics, and (d) general papers.

It was voted to invite the Association of State Registration Executives to organize the session on registration problems, and to invite their President to chair the meeting jointly with the Section Chairman.

Votes of thanks were extended to Dr. W. J. V. Deacon for suggestions offered for the program, and to Dr. Dublin for the use of a meeting room.

A. W. HEDRICH, Sc.D., *Secretary*

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Joseph T. Brennan, M.D., Court House, Independence, Mo., Jackson County Health Commissioner

W. M. Brien, M.D., 449 Main St., Orange, N. J., Health Officer

Wheeler Davis, M.D., Kennett, Mo., Dunklin County Health Officer

Alfred D. Gregg, M.D., Asheboro, N. C., County Health Officer

Charles A. Harris, M.D., City Hall, London,

Ont., Canada, Medical Officer of Health
Jerome M. Jekel, M.D., 1800 E. Capitol Drive, Milwaukee, Wis., Health Commissioner of Shorewood

Morton L. Levin, M.D., Dr.P.H., Court House, Grand Haven, Mich., Ottawa County Health Officer

Zack P. Mitchell, M.D., Henderson, N. C., County Health Officer

William J. Owings, M.D., Vernon, Ala., Lamar County Health Officer

Dr. H. H. Pansing, 2603 Salem Ave., Dayton, O., Montgomery County Health Commissioner

Arnold L. Peterson, 116 Temple St., Los Angeles, Calif., Executive Assistant to Health Officer

Andrew J. Signorelli, M.D., City Hall, Clayton, Mo., Health Commissioner

F. Michael Smith, M.D., Vicksburg, Miss., County Health Officer

Laboratory Section

Joseph W. E. Harrison, 214 S. 12 St., Philadelphia, Pa., Lecturer, Philadelphia College of Pharmacy and Science; Consulting Chemist

Nell Hirschberg, M.A., 2900 Ellis Ave., Chicago, Ill., Assistant in Bacteriology, Michael Reese Hospital

Vital Statistics Section

Paul B. Cornely, M.D., Dr.P.H., Howard University, Washington, D. C., Assistant Professor in Public Health

Richard J. Learson, B.A., 4th & Broadway, Cincinnati, O., Associate Actuary, Western & Southern Life Insurance Company

Chettikulam N. Nayagam, 615 N. Wolfe St., Baltimore, Md., Student, Biostatistics Dept., Johns Hopkins School of Hygiene

Samuel A. Stouffer, Ph.D., University of Wisconsin, Madison, Wis., Professor of Social Statistics

William R. Tracey, B.A., Dominion Bureau of Statistics, Ottawa, Ont., Canada, Acting Chief, Vital Statistics Branch

Food and Nutrition Section

Bion R. East, D.D.S., National Oil Products Co., Harrison, N. J., Technical Consultant

James M. Frayer, B.S., Vermont Agricultural Experiment Station, Burlington, Vt., Dairy Bacteriologist

Walter H. Grunze, 622 W. 141 St., New York, N. Y., Inspector of Foods, Dept. of Health

Child Hygiene Section

Frances Johnson, M.D., 425 E. Wisconsin Ave., Milwaukee, Wis., Child Welfare Physician, Health Department

Frances M. Johnson, M.D., 719 Marion National Bank Bldg., Marion, Ind., Physician, Public Schools

Benjamin Lieberman, M.D., 2635 W. North Ave., Milwaukee, Wis., Child Welfare Physician, Health Department

Public Health Education Section

Charles St. J. Butler, M.D., U. S. Naval Hospital, Brooklyn, N. Y., Commanding Officer

Q. Edward Gatlin, B.A., P. O. Box 770, Jackson, Miss., Secretary, Committee on Post-graduate Medical Education, Mississippi State Medical Assn.

Public Health Nursing Section

Helen S. Ebbert, 505 Fulton St., Bay City, Mich., Public Health Nurse

Kathryn W. McCabe, R.N., 1219 N. 6 St., Boise, Idaho, State Supervising Nurse, E.R.A. Nursing Project

Ida M. Rainwater, U. S. Trachoma Hospital, Rolla, Mo., State Field Nurse

Opal Smith, R.N., St. John's Hospital, Jackson, Wyo.

Epidemiology Section

Esmond R. Long, M.D., Ph.D., Henry Phipps Institute, 7th & Lombard Sts., Philadelphia, Pa., Director of Laboratory

Unaffiliated

Marguerite M. Roe, R.N., 1732 Sheridan Ave., Whiting, Ind., County Medical Investigator

William M. Wade, P. O. Box 186, Westfield, Mass., Engineer, Westfield State Sanatorium

DECEASED MEMBERS

A. Brioso Vasconcelos, M.D., Mexico, Mex., Elected Member 1921, Fellow 1923

Lemar W. Andrews, M.D., Warsaw, N. Y., Elected Member 1919

M. Frances Etchberger, Baltimore, Md., Elected Member 1931

Harry F. Ferguson, Springfield, Ill., Elected Member 1916

John C. Humphreys, M.D., Philadelphia, Pa., Elected Member 1926

John Le Feber, Milwaukee, Wis., Elected Member 1913

Anna M. Scholfield, Providence, R. I., Elected Member 1932

Charles Strauss, New York, N. Y., Elected Member 1914

William H. Wakelee, Southbury, Conn., Elected Member 1933

DR. KENDALL EMERSON AND DR. JESUS E. MONJARAS ELECTED TO HONORARY FELLOWSHIP IN THE ASSOCIATION

ACTING on the recommendation of the Executive Board, the Govern-

ing Council has unanimously elected to Honorary Fellowship Dr. Kendall Emerson, past Executive Secretary of the Association, and Dr. Jesus E. Monjaras of Mexico City.

NEWS FROM THE FIELD

MENTAL DEFICIENCY

THE Annual Meeting of the American Association on Mental Deficiency will be held at the Hotel Palmer, Chicago, on April 25, 26, and 27. The sessions on the 25th and 26th will be devoted to studies on Mongolism; Birth Injury as an Etiological Factor in Mental Deficiency; Mental Disorders in Mental Deficiency; The Problem of Sterilization; Defective Delinquency and Its Relation to Penal Institutions; Community Supervision of the Paroled Mental Defective; and Newer Methods in Institutional Training for Community Life. The session on April 27, will be devoted to the sociological, psychological, and the special education aspects of Mental Deficiency. Complete data on the program may be obtained from the Secretary, Dr. Groves B. Smith, Godfrey, Ill.

INDIAN MEDICAL SERVICE

ONE feature of the new policy of the Indian Medical Service is to conduct Institutes as refresher courses for physicians and nurses. The first undertaking in this direction is scheduled for the Navajo Area physicians and nurses March 4 to 15. Two groups of physicians and two groups of nurses will sit at the feet of Dr. Walter Clarke of the American Social Hygiene Association in an Institute on Syphilis. This arrangement will afford all of our 20 physicians and most of our 62 nurses an opportunity to refresh themselves on the best accepted scientific practices relating to the diagnoses, treatment, and control of syphilis. With tuberculosis and trachoma, syphilis completes our triumvirate of scourges draining Indian health.

Another bit of news is the formation of an Indian Medical Society in the States of Arizona and New Mexico. The nucleus around which this organization was built was our Navajo physicians, but since there are Reservations in other parts of these two states, our Washington Office has proposed the formation of two additional branches; one for Arizona and one for New Mexico. It so happens that the membership will be 18 or 19 for each group.

These past months have been particularly hard ones for the Indian people in the Navajo Reservation because of the unusual incidence of influenza, measles, chicken pox, mumps, and pneumonia following measles or influenza. Our physicians and nurses have also been handicapped by an unusual precipitation in the form of snow and rain, making the roads almost impassable.—Excerpt from letter from W. W. Peter, M.D., Dr.P.H., F.A.P.H.A., Medical Director Navajo Area, Albuquerque, N. M., Feb. 26, 1935.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

AT the Annual Meeting of the Massachusetts Association of Boards of Health, held in Boston on January 31, 1935, the following officers were elected: *President*, Paul R. Withington, M.D., Milton; *First Vice-President*, Ernest M. Morris, M.D., Fall River; *Second Vice-President*, Curtis M. Hilliard, Wellesley; *Secretary-Treasurer*, G. Donald Buckner, Needham. Dr. Charles F. Wilinsky was appointed to represent the association on the Governing Council of the A.P.H.A.

The first two sections to be estab-

lished in the association are the Board of Health and the Laboratory Sections. These held their first meeting preceding the Annual Meeting, and elected the following officers for 1935: Board of Health Section—*Chairman*, Francis G. Curtis, M.D., Newton; *Secretary*, William O. Hewitt, M.D., Attleboro; Representative to Executive Committee, John J. McGrath, Salem; Laboratory Section — *Chairman*, Frank E. Mott, B.S., LL.B., Boston; *Secretary*, Roy F. Feemster, M.D., Boston; representative to the Executive Committee, Herbert E. Bowman, North Acton.

HADASSAH LAUNCHES RESEARCH PROGRAM

IN addition to curative and preventive work Hadassah will soon enter the realm of medical research and teaching. Through the proposed Rothschild-Hadassah-University Hospital in Jerusalem, which will be build by Hadassah and the American Jewish Physicians' Committee, large-scale research will be carried on in a number of diseases, including cancer. The new medical center will include a graduate school of medicine to be affiliated with the Hebrew University. The heads of the hospital research and teaching departments will include eminent scientists exiled from Germany.

SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

AT the Annual Meeting of the Southern California Public Health Association, held at Santa Barbara, Calif., on January 26, 1935, the following officers were elected:

President—Dr. E. B. Godfrey, San Bernardino

President-Elect—Dr. R. V. Stone, Los Angeles

First Vice-President—Dr. R. C. Main, Santa Barbara

Second Vice-President—Dr. W. F. Foxe

Secretary-Treasurer—T. P. B. Jones, Riverside

VENEREAL DISEASE ESSAY CONTEST

THE council of the British Medical Society for the Study of Venereal Diseases announces a prize of £18 to be awarded the best critical review dealing with any venereal disease considered from any angle. The essay selected for the prize will become the property of the council, and the council will be at liberty to publish in the *British Journal of Venereal Diseases* any paper other than the one receiving the award.

Contributions should be about 6,000 words, typed, and sent to the Secretary of the Society, 43 Queen Anne Street, London, W.1, before July 31, 1935.

ALABAMA COUNTY HEALTH DEPARTMENT DISCONTINUED

THE Geneva County Health Department has been discontinued in accordance with a decision of the Alabama Board of Commissioners. Dr. Lucius S. Nichols was the County Health Officer.

HEALTH UNIT OF THREE COUNTIES

A THREE-COUNTY health unit, which includes El Paso, Hudspeth, and Culbertson Counties, has been established under the supervision of Dr. Thomas J. McCamant, member A.P.H.A., Director of the City-County Health Unit of El Paso.

SUMMER ROUND-UP BEGINS

THE 11th annual Summer Round-Up of the Children, major child health project of the National Congress of Parents and Teachers, will soon be in full swing. Although May 1, National Child Health Day, is the official opening date of the nationwide campaign, parent-teacher associations already are busy with the preliminary work of securing the names of preschool children and preparing for the campaign. The object of the Summer Round-Up is to send to the entering grade of school a class of children as free as possible from remediable physical defects.

PERSONALS

KENDALL EMERSON, M.D., F.A.P.H.A., Director of the National Tuberculosis Association, spoke at the Second National Conference on Slum Clearance and Rehousing, in Washington, January 18, on the public health aspects of a national rehousing program. He stated that the spread of tuberculosis had been checked by public education, but the death rates in slum areas still equal the high mortality of the nation as a whole a generation ago.

LEONARD GREENBURG, M.D., Fellow A.P.H.A., Acting Health Officer of New Haven, has been placed in full charge of the Department of Health of New Haven. He succeeds Dr. John L. Rice, who left New Haven to become Health Officer of New York City.

WILSON CARTER WILLIAMS, M.D., member A.P.H.A., has been appointed State Health Officer of Tennessee. He has been a member of the Department staff since 1926, and succeeds Eugene L. Bishop, M.D., Life Member and President of the A.P.H.A., who resigned to become full time Health Officer of the Tennessee Valley Authority.

HENRY R. O'BRIEN, M.D., F.A.P.H.A., has been provisionally appointed Commissioner of Health in Cattaraugus County, N. Y., to fill the vacancy caused by the resignation of Reginald M. Atwater, M.D., who has become the Executive Secretary of the A.P.H.A. Dr. O'Brien was graduated from the University of Michigan and has spent some years in the Orient with the Rockefeller Foundation. He holds a Certificate in Public Health from Johns Hopkins, has been a County Commissioner of Health in Ohio, and for the last 6 months has been on the staff of the New York State Department of Health, Albany.

THOMAS J. LEBLANC, Sc.D., member A.P.H.A., has been advanced from Associate Professor of Preventive Medicine in charge of a new department of preventive medicine at the University of Cincinnati College of Medicine.

ROSSELL H. JOHNSON, M.S., formerly of the University of Pittsburgh, has been appointed social hygienist in the Palama Settlement, Honolulu, and part time professor in the University of Hawaii. He will give courses in social hygiene and eugenics.

JOSE FABELLA, M.D., member A.P.H.A., of Manila, has been appointed Commissioner of Health and Welfare of the Philippine Islands.

GEORGE C. RUHLAND, M.D., F.A.P.H.A., Commissioner of Health of the City of Syracuse, N. Y., since 1928, has accepted the office of Health Commissioner of the District of Columbia, to succeed William C. Fowler, M.D., member A.P.H.A., who has retired. Dr. Ruhland entered the field of public health in 1905. He became bacteriologist and then director of laboratories in Milwaukee Health Department, which position he held for 8 years. In 1914 he was appointed Commissioner of Health of Milwaukee, in which position he served until 1924, when he became Director of the Syracuse Health Demonstration on the staff of the City Department of Health. He was made Commissioner in 1928.

E. S. MACPHAIL, F.A.P.H.A., after more than 33 years' association with the statistical service of Canada, has retired as Chief of the Demography Division of the Dominion Bureau of Statistics. He entered the Canadian Civil Service in 1901 as Chief Clerk in the Fourth Census, became Superintendent of Compilation of the 1911 Census, and in that capacity introduced mechanical tabulation into the Census Office. In 1918 he took a

leading part in the organization of the registration system for births, marriages, and deaths in Canada. In the same year, the Dominion Bureau of Statistics was formed, and Mr. MacPhail was appointed Chief of the Demography Division, which embraced the census and, since 1920, the compiling of vital statistics. Mr. MacPhail has been a member of the Council of the Vital Statistics Section of the A.P.H.A. since 1930. Articles by him were published in the *Journal* on the subject of infant mortality in May, 1927; on accident classification in January, 1929; and on maternal mortality in June, 1932. He has also contributed extensively to Canadian journals. W. R. Tracey has, since Mr. MacPhail's retirement, been appointed Acting Chief of the Vital Statistics Office. A. W. H.

CHESTER S. BOWERS, B.S., member A.P.H.A., recently resigned as Director of the Health Laboratory of New Britain, Conn., to accept the position of Senior Microbiologist in the Bureau of Laboratories of the Connecticut State Department of Health, Hartford, Conn.

CHARLES M. PEARCE, M.D., member A.P.H.A., of McAlester, was appointed State Health Commissioner of Oklahoma on February 8.

PEARL L. KENDRICK, Sc.D., F.A.P.H.A., Bacteriologist of the Michigan Department of Health, recently received a grant for research in antigenic properties of bacillus pertussis from the National Research Council.

DR. MILTON R. KUKUK, of Toledo, O., has been appointed Health Commissioner of Lucas County, to succeed the late Dr. Fred F. Devore.

JAMES S. HOUGH, M.D., F.A.P.H.A., of Livingston, Ala., Health Officer of Sumter County, has been named District Medical Superintendent in charge of eleven counties.

DR. HENRY T. DONOVAN, of Marion,

Ala., has been appointed Health Officer of Shelby County, succeeding Dr. John M. Kimmey, of Columbiana.

DR. CECIL KENT DRINKER has been appointed Dean of the Harvard School of Public Health, effective September, 1935, to succeed Dean Dr. Edsall. He is at present Professor of Physiology and Acting Dean.

DEATHS

JOHN RUHRAH, M.D., prominent pediatrician, author and lecturer of Baltimore, Md., died March 10. He was president of the American Pediatric Society, 1925; of the Medical Library Association, 1927; of the Maryland Medical and Chirurgical Faculty, 1919; of the American Academy of Pediatrics, 1934; and of the Osler Historical Society since 1933. In addition to medical history, he specialized in nutrition, clinical pediatrics, poliomyelitis, and dietetics, and wrote many books.

DR. JABEZ NORTH JACKSON, City Health Director of Kansas City, Mo., since 1932, died March 18. In the Spanish-American War Dr. Jackson was chief of the Second Division Hospital, Second United States Army Corps, near Harrisburg, Pa. He was president of the American Medical Association in 1926.

DR. LUTHER C. PAYNE, Health Officer for 20 years of Liberty, N. Y., died March 16. He was Liberty's second health officer in 50 years.

DR. F. F. DEVORE, District Health Commissioner of Lucas County, Toledo, O., died recently.

CONFERENCES

March 31–April 7, National Negro Health Week—21st Annual Observance.

April 3–5, Municipal Training Institute of New York State: Municipal

- Training School for City and Village Sewage Works Operators and Sewer Superintendents of New York State; State Office Building, Albany, N. Y.
- April 4, 5, Ohio-Michigan-Indiana-Ontario-New York-Pennsylvania Sectional Meeting of the American College of Surgeons, Cleveland, O.
- April 10-11, Montana Section of American Water Works Association, Helena, Mont.
- April 11-12, Four States Section Meeting of American Water Works Association, Atlantic City, N. J.
- April 24-27, National Convention, American Physical Education and its Eastern District Society, Pittsburgh, Pa.
- April 25-27, Annual Meeting of the American Association on Mental Deficiency, Chicago, Ill.
- April 29-May 3, 39th Annual Convention, National Congress of Parents and Teachers, Miami, Fla.
- April 29, 19th Annual Meeting of the New York State Association of Public Health Laboratories, Syracuse Memorial Hospital, Syracuse, N. Y.
- April 29-May 3, 19th Annual Clinical Session of the American College of Physicians, Philadelphia, Pa.
- May 12, Mothers Day.
- May 6-10, Annual Convention of American Water Works Association, Cincinnati, Ohio.
- May 14, 15, 19th Annual Meeting of the Central Atlantic States Association of Dairy, Food and Drug Officials, Richmond, Va.
- May 20-22, Tenth Annual Meeting of the American Association for Adult Education (66 East 42 Street, New York), Milwaukee, Wis.
- May 24-25, Spring Meeting of New York State Sewage Works Association, Poughkeepsie, N. Y.
- June 3-5, Twenty-Fourth Annual Meeting, Canadian Public Health Association, in conjunction with the Ontario Health Officers' Association, Canadian Tuberculosis Association, and Canadian Social Hygiene Council. Royal York Hotel, Toronto.
- June 4-9, Annual Meeting, Royal Institute of Health, Harrogate, England.
- June 9-15, National Conference of Social Work, Montreal, Que., Canada.
- June 10-14, Annual Meeting of the American Medical Association, Atlantic City, N. J.
- June 17-19, Ninth Annual Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.
- June 19-22, Eighth Health Education Conference of the American Child Health Association, Iowa City, Iowa.
- June 24-27, Annual Meeting of the National Tuberculosis Association, Saranac Lake, N. Y.
- June 24-29, Summer Meeting of the American Association for the Advancement of Science and Associated Societies, Minneapolis, Minn.
- July 1-3, Sixth Annual Meeting, Western Branch American Public Health Association, Helena, Mont.
- July 15-20, Royal Sanitary Institute Health Congress, Bournemouth, England.
- July 22-27, Seventh International Congress on Industrial Accidents and Diseases, Brussels, Belgium.
- July 23-27, International Congress on Life Assurance Medicine, London.
- July 31-Aug. 3, Annual Meeting of the American Dental Society of Europe, London.
- Aug. 10-17, Meeting of Health Section of the World Federation of Education Associations, Oxford, England.
- October 7-10, Sixty-fourth Annual Meeting of the American Public Health Association, Milwaukee, Wis. Headquarters: Hotel Schroeder.
- October 14-18, 24th Annual Safety Congress, National Safety Council, Inc., Louisville, Ky.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

May, 1935

Number 5

Reaction of Familial Contacts to Scarlet Fever Infection*

J. E. GORDON, M.D., G. F. BADGER, GEORGE B. DARLING, DR. PH.,
AND SARAH S. SCHOOTEN, M.D.

*Division of Epidemiology, W. K. Kellogg Foundation, and the Herman Kiefer
Hospital, Department of Health, Detroit, Mich.*

VARIOUS epidemiological aspects of scarlet fever have been reported from observations of a relatively large group of patients isolated at the Herman Kiefer Hospital, Detroit. Studies limited to hospital patients fail to give a comprehensive idea of the epidemiological problems associated with this disease. Even in large cities the majority of persons with scarlet fever are not isolated at a hospital. Conditions affecting the transmission and control of the infection differ considerably when the patient remains at home. A great part of the information about the clinical nature of scarlet fever, and much of its epidemiological behavior have been determined by hospital studies, because of the greater ease with which precise and continued observations can be made, the facilities for laboratory examinations, the better opportunity for control of disturbing factors, and the generally

better available records. Information about a group of patients isolated at home, and studied as nearly as possible with equal thoroughness and with the same methods, offers the possibility of contribution to the broader problem.

Influenced by these considerations, an epidemiological survey of scarlet fever under home conditions was started in the summer of 1931 among an urban population of Detroit. The observations have extended through 3 years, and are concerned only with ordinary endemic scarlet fever, not with a sharp outbreak of the disease. The information from such a study cannot of course be given universal interpretation. In rural communities, for example, environmental conditions are different; there is variation in the multiplicity of contacts, in response to the infection, and assuredly in the opportunity for continued transmission of the infectious agent. Nevertheless, a more exact appreciation of the epidemiological problems in urban communities can in all likelihood be obtained through comparison of this information with the be-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 5, 1934.

havior of the disease in a group of hospital patients, studied by essentially the same methods.

A variety of interests have naturally been involved in this field study of scarlet fever. Information was desired on the reservoirs of infection during the time when scarlet fever was at a low level in the community, and on the factors involved in school epidemics, their origin, development, and extent. General opinion has catalogued scarlet fever as a disease whose transmission is related more to carriers than to contact with actual cases. A quantitative evaluation was desired. An answer has been sought as to how scarlet fever is introduced into families; and an attempt made to determine the effectiveness of various administrative procedures for the control of the disease, particularly isolation. The material in this report is restricted to the reaction of the familial contacts in homes invaded by scarlet fever infection.

METHOD

The area selected for study represents one of the sanitary districts of Detroit. The population, 100,000, was sufficient to permit adequate data. The district is residential, and the population principally white. A very small negro population is included, but scarlet fever occurred in only 2 colored families in the course of these observations. About one-third to one-half of the population is in average economic circumstances, with living conditions representative of the usual residential area in Detroit. The area also has two relatively poor neighborhoods, one with a population principally of Italian origin, the other native born; and two better than average residential districts, one of which is a university neighborhood.

Field studies were started in the summer of 1931 and continued uninterruptedly until the summer of 1934. An epidemiological investigation was made

of 1,097 families in which cases of scarlet fever were reported. The primary cases of 732 families were isolated at home, and 365 at the hospital for communicable diseases.

This study was definitely independent of the work of the regular staff of the Health Department. They made their usual investigations and effected their usual recommendations without influence. No attempt was made to correct deficiencies in control that we might discover independently, such as an unrecognized and unreported infection. The greater benefit was thought to rest in determining the behavior of scarlet fever infection under usual and ordinary circumstances.

The first visit to the home was principally devoted to obtaining information about the source of the infection. Schoolmates, playmates, and all other persons involved were later investigated. Record was made of the age, past history of scarlet fever, and number of familial contacts. The Dick test for immunity to scarlet fever was made at this time, and cultures were prepared from swabbings of the nose and throat, to be examined for the presence of hemolytic streptococci.

A second visit was made the following day. The results of the Dick test were determined, and inquiry was made regarding other illness and possible extension of the infection among members of the family. Subsequently, visits were made at the end of the first and second weeks. The purpose was to determine if others of the family had contracted scarlet fever, or had been ill with any acute infection, and for the original patient to determine the course of the disease, and the presence or absence of complications.

The fifth visit was made at the end of 4 weeks, about the time that isolation was terminated, in order to determine the clinical condition of the patient, and particularly the factors which might

account for transmission of infection after release. Some of the patients had been isolated at the hospital and some at home. A comparison was made of the reaction of contacts after isolation by these two methods.

The next visit was about 8 weeks after the onset of the original infection. The behavior of the contacts in the intervening month was recorded and all of the events in the course of the preceding 2 months were reviewed and summarized. Contacts with an originally positive Dick reaction were retested. Some of those who had reacted negatively were also tested. Cultures were again taken for hemolytic streptococci. The final visit was made the next day to determine the result of the Dick test.

The first and sixth visits were by a physician, the others by one of two specially qualified nurses, carefully trained in epidemiological methods. Special visits to investigate a new case, indeterminate illnesses, or other unusual circumstances were made by the medical epidemiologist.

Every home with a case of scarlet fever was visited, but records are not complete for all. Most of the patients were under the care of private physicians. Before epidemiological investigation was undertaken the approval of the physician was asked, and almost always obtained, but there were exceptions. Because of this procedure, some delay in making the first visit to the home was unavoidable. This was sometimes possible on the same day that the case was reported, but the following day was more usual. Some contacts had by that time already been removed to the home of an adult friend outside of the isolation area. Many times the wage earner had taken other quarters. In rare instances the head of the family refused permission, but one of the encouraging features of the study was the ready cooperation encountered. Occasionally, because of the stress of in-

creased numbers of reported cases during the season of greatest prevalence, epidemiological investigation could not immediately be made. Later, as conditions permitted, this was done, but no investigation made later than 1 week after the first reported case is included in this report.

PAST HISTORY OF FAMILIES WITH SCARLET FEVER

In the course of the 3 year study, scarlet fever occurred in 1,097 families in the area studied, with at least 1 case in each. The number of individuals in these families was 5,352; 2,455 were children less than 15 years of age and 2,897 were adults. The previous occurrence of scarlet fever in this group is shown in Table I. Relatively few (9) of the 670 children less than 5 years of age had previously had scarlet fever. The proportion in the age group 5 to 9 years was distinctly greater, 84 (7 per cent) of 1,194. Of 591 older children, aged 10 to 14 years inclusive, 87 had had scarlet fever, or 14.7 per cent (Table I).

TABLE I
AGE DISTRIBUTION OF INDIVIDUALS IN FAMILIES WHERE SCARLET FEVER OCCURRED,
ACCORDING TO HISTORY OF PREVIOUS SCARLET FEVER

Age	No Previous Scarlet Fever	Previous Scarlet Fever	Uncertain about Previous Scarlet Fever	Totals
0- 4 yr.	654	9	7	670
5- 9 "	1,100	84	10	1,194
10-14 "	494	87	10	591
15 + "	1,923	688	286	2,897
Totals	4,171	868	313	5,352

The number of adult persons who gave a history of previous scarlet fever was 688 of 2,897 questioned, or 23.7

per cent. The proportion was so unexpectedly great, that a check was made by examining a sample of the records of scarlet fever patients reported in Detroit during the first 6 months of 1934. The frequency of previous scarlet fever among adult contacts was found to be 16.4 per cent. These data were obtained in the course of the usual public health investigation by many different public health nurses. This percentage is also measurably higher than one would have anticipated.

Before scarlet fever entered this group of 1,097 families, 180 of the 2,455 children and 688 of the 2,897 adults had already had scarlet fever.

SCARLET FEVER IN FAMILIES

Knowing the past history of scarlet fever in these family groups, the circumstances are now presented under which scarlet fever subsequently occurred. All of the family groups had at least 1 case of diagnosed and reported scarlet fever. Although the number of families was 1,097, 1,102 cases of scarlet fever are considered to have been primary infections. In 3 families the disease developed simultaneously in 2 persons, and in one instance 3 cases developed on the same day. This accounts for the discrepancy between the number of families and the number of primary cases.

Scarlet fever usually appeared suddenly in an otherwise healthy group (868 families). The source of the infection is not of present interest. In 30 instances, the first reported case was actually not the initial invasion of the household. Some other member of the family group had previously had an acute infection whose identity as scarlet fever was first recognized when the second case developed, the 2 being reported at the same time. The interval between the 2 was always more than 4 days, that being our interpretation of the limit of acceptable reporting. The

original infection in 41 other families was an undiagnosed case, determined by epidemiological investigation but never reported by the attending physician. Throughout the isolation period these patients were not restricted from association with contacts.

In this report the term undiagnosed scarlet fever will refer to unrestricted persons with a history of an acute illness compatible with that of scarlet fever, and will indicate actual observation by the epidemiologist of either a scarlatiniform eruption of the skin, or the typical desquamation of scarlet fever.

In a considerable proportion of families (158) an interesting and unsuspected observation was made. An indeterminate illness of the upper respiratory tract in another member of the family had shortly preceded the appearance of scarlet fever. The usual interval between such illnesses and the appearance of scarlet fever was about 1 week, sometimes 3 or 4 days, occasionally 2 weeks. Most of these infections were tonsillitis, although a not inconsiderable number resembled common colds. In subsequent tabulated data, distinction is made between the two. A number were strongly suggestive of scarlatinal infections, but our requirements for classifying an infection as undiagnosed scarlet fever were strict. Two examples of such questionable infections are in point.

Case 1—A woman, aged 34, had fever, sore throat, and headache. She noticed no eruption of the skin. Twelve days later a daughter, aged 4 years, developed scarlet fever. The previous illness of the mother was recorded at this time. Physical examination showed suggestive but indefinite desquamation, limited to the ends of the fingers. Her illness was classed as tonsillitis. The child had had no known exposure to scarlet fever.

Case 2—A boy, aged 5, had fever, vomited, did not complain of sore throat, had a discharging nose, and when seen 3 days later gave the impression of having a slight subcuticular flush, perhaps compatible with a

disappearing rash, but this was decidedly indefinite. The mother stated that she had noticed no rash. The tongue appeared normal. Cultures of the throat contained hemolytic streptococci. Desquamation was never observed. The illness was classed as an upper respiratory infection. The mother developed classical scarlet fever 3 days after the onset of the boy's illness.

Often such illnesses were not limited to a single member of the family; 206 individuals were involved in the 158 families in which this circumstance was noted. In 3 of the families the succession of events was a nonspecific illness, then an undiagnosed case of scarlet fever, and finally recognized scarlet fever (Table II).

TABLE II
ILLNESSES IN FAMILIES BEFORE
RECOGNITION OF SCARLET FEVER

	Number of Families	Number of Persons Ill
No illness	868	—
Scarlet fever, unrecognized until second case	30	41
Scarlet fever, undiagnosed	41	43
Upper respiratory disease	158	206
—with hemolytic streptococci	70	78
—without hemolytic streptococci	54	78
—not cultured	34	50

In connection with these illnesses which preceded scarlet fever there are two points of interest: (1) Were they streptococcus infections? (2) Are they to be considered the means by which scarlet fever was introduced into the family? The idea that scarlet fever may exist in larval form is of course not new, nor has the possibility been

neglected that this is one of the ways in which it is transmitted. Many reports are on record. Information is lacking in regard to the quantitative importance.

Cultures from the nose and throat of persons with antecedent illnesses were made at the time the first case of scarlet fever was reported. It will be recalled that this was shortly after the onset of the reported case. It was manifestly impossible to know their nature earlier, because it was the reporting of scarlet fever which initiated the investigation. Cultures were taken from 156 persons; hemolytic streptococci were present in about half. Streptococcus infection is suggested. It is possible also that these patients may have developed, a carrier condition through contact with the patient with scarlet fever, and that the original illness was not of streptococcal nature.

Whatever the interpretation, individuals with these illnesses preceding scarlet fever had the highest hemolytic streptococcus rate (50 per cent) of any group of contacts. Other members of the same families but without an upper respiratory infection had a rate of 23 per cent. Members of families free from infections of this kind had the lowest rate, 17 per cent (Table III).

Contributing pertinently to the interpretation of these illnesses is the fact that people with such antecedent upper respiratory infections did not develop scarlet fever with anywhere near the same frequency as did contacts in general (ratio 1:3), despite the fact that hemolytic streptococcus invasion of the upper respiratory tract was more frequent. Many unusual circumstances determined by epidemiological investigations contributed strongly to the belief that it was by this means that scarlet fever was introduced into families. Numerous interesting examples could be cited, but the following are typical:

TABLE III
HEMOLYTIC STREPTOCOCCUS CARRIERS
AMONG CONTACTS TO PATIENTS WITH SCARLET FEVER

	Hemolytic Streptococcus Cultures			
	Positive		Negative	
	No.	%	No.	%
Individuals with upper respiratory infections preceding scarlet fever	78	50.0	78	50.0
Contacts to these	63	23.0	211	77.0
Totals	141	32.8	289	67.2
Contacts to cases where no illness preceded the first case	332	16.8	1,649	83.2

Case 3—One of 2 boys contracted scarlet fever. They were class-mates, friends, and both were 7 years of age. Three days later the second boy had a severe sore throat, fever, and headache, but no eruption and no subsequent desquamation. After another interval of 3 days his brother, aged 9, developed typical scarlet fever. On the same day a 12 year old sister was also acutely ill, had an indefinite eruption, was not considered to have scarlet fever, but later desquamated. On the day following these 2 infections a 15 year old brother developed a sore throat, of much the same nature as the original infection of the 7 year old, without eruption and, as determined by later investigation, without desquamation.

Case 4—An intimate playmate of a boy, aged 8 years, developed an acute sore throat. Whether or not this was the source of the second infection is impossible to determine with exactness. At any rate, 10 days later the second child developed sore throat and after another 11 days, an abscess of a cervical lymph node was incised. The child had no rash at the time of the acute illness and never desquamated. Three days after the gland was incised there were 3 outspoken cases of scarlet fever in the family, affecting children aged 6, 8, and 12 years. The sudden appearance of these 3 cases on the same day indicates an infection from a single source. Two days later another child, aged 3 years, developed scarlet fever, apparently secondary to one of the other 3.

Case 5—Two visitors, a man and wife, were house guests at the home of friends. In the course of their journey, the lady had developed a sore throat, present at the time of their arrival. No rash was noted, nor was there subsequent desquamation. Three days later an adult member of the family developed a sore throat, said to have been of relatively severe nature, but unaccompanied by a rash. Four days later a child, aged 3 years, had typical scarlet fever. Later both the mother and the child desquamated typically. Hemolytic streptococci were demonstrated in cultures from the throats of both visitors, the mother and the child.

The likelihood that such throat infections are many times of scarlatinal nature has long been accepted. Examples like those given are not unique. A quantitative evaluation of such infections as a possible factor in the spread of scarlet fever has not been made. In this experience such nonspecific illnesses preceded scarlet fever in 14.4 per cent of families.

ORIGIN OF SECONDARY CASES

Family contacts exposed to an original case of scarlet fever included 4,250 individuals, of whom 1,446 were children and 2,804 were adults.

The number who thereafter developed recognized and reported scarlet fever was 266. All cases occurred at least 1 day after the original infection and within 2 months. In addition 44 other persons had unrecognized scarlet fever subsequent to the original reported illness in the family and likewise are secondary cases but were never reported. They are to be added to the 266, making in all 310.

How was scarlet fever spread from the original case to a healthy contact? About one-third are attributed to direct contact infection from the original case; that is to say, transmission was from case to case. This was true for 93 of the recognized secondary cases and 11

of those undiagnosed. This interpretation was made only when the interval between cases was less than 1 week. The usual time was 2, 3, or 4 days. This does not eliminate the possibility of carriers, but it is felt that case to case transmission is the most likely interpretation (Table IV).

Another group of secondary cases was considered to have developed through the agency of contact carriers. When this interpretation was made, the original patient had been isolated at least 1 week, and there had been no intermediate cases. A second type of carrier includes persons with intermediate illnesses of the type described as often preceding scarlet fever. Eighteen

TABLE IV
ORIGIN OF SECONDARY CASES

Sources of secondary cases	Diagnosed Secondary Cases			Undiagnosed Secondary Cases		
	Primary Case at Home	Primary Case at Hospital	Totals	Primary Case at Home	Primary Case at Hospital	Totals
Diagnosed cases (within one week)	54	45	99	6	5	11
Undiagnosed cases, later diagnosed	36	5	41	6	..	6
Undiagnosed, primary cases	42	..	42	3	..	3
Undiagnosed, secondary cases	2	1	3	3	..	3
Probable carriers	28	5	33	8	2	10
Intermediate illness:						
—with hemolytic streptococci	2	5	7	2	..	2
—no hemolytic streptococci	2	4	6	..	..	..
—not cultured	2	..	2	1	..	1
Convalescent carriers	11	22	33	6	2	8
Totals	179	87	266	35	9	44

secondary cases are thought to have originated from such persons. Three-fifths of those investigated were found to harbor hemolytic streptococci in the upper respiratory tract. The third group of carriers disseminated the infection after release from isolation; convalescent carriers. Transmission of infection was of this nature in 41 instances. Hemolytic streptococci were demonstrated in some member of about one-half of the families when the secondary case was supposed to have originated from a carrier.

Still another part of the secondary infections originated from cases of scarlet fever not discovered until a second person developed the disease. Thirty of these original cases were then reported as scarlet fever; 41 never were. Of the secondary cases they caused, 83 were reported and 9 were not. It is difficult to classify secondary cases of this origin as representing case to case transmission or infection by carriers. Arbitrarily, if the secondary case occurred within 1 week of the original illness it has been listed as due to contact with a case; and if the interval was longer, as arising from a convalescent carrier. Recognizing the inexactness which must enter into such an arbitrary division, 40 of this group of secondary cases have been attributed to the acute infection of scarlet fever, and 52 to the agency of carriers, either healthy or convalescent.

Distributing all secondary infections according to isolation of the primary case at home or in the hospital, 102 cases secondary to patients isolated at home are considered as due to infection from a case, and 112 to carriers. For hospital cases the distribution is somewhat different in that 43 were of carrier origin and 53 from cases.

Scarlet fever in general is considered a disease largely arising from intermediate carriers, providing unknown sources are included as carriers. There

is no reason to doubt this opinion from our experience but certainly in this problem of secondary cases among familial contacts, case to case transmission is an equally important consideration. This is true whether the patient was isolated at home or in the hospital.

REACTION OF CONTACTS TO THE INFECTION

Previous discussion has been concerned with the nature of the original infection in families where scarlet fever appeared and the means by which it gained entrance into the family. Attention is now directed to what happened thereafter, the reactions of the contacts to the infection. As indicated, a considerable number developed scarlet fever; others had scarlet fever as certainly as the first group, but the disease was not reported. They are classed as having undiagnosed scarlet fever.

A third group of people contracted sore throat which, so far as could be determined by questioning or by observation, was unattended by an eruption; and definitely, by observation, was without desquamation. A fourth group had upper respiratory infections of the general nature of common colds subsequent to the appearance of scarlet fever in the family, likewise without eruption or desquamation of the skin. The great majority of the contacts had no illness (Table V).

The number of persons who were reported as having contracted scarlet fever subsequent to an initial primary case, either diagnosed or undiagnosed, was 266, and the secondary attack rate is thus determined as 6.3 cases per 100 contacts. Seven of these persons had a history of previous scarlet fever and presumably the current illness represented a second attack. The correctness of the information about previous attacks of scarlet fever depends upon the statement of the individual. It was

TABLE V
ILLNESSES IN CONTACTS ACCORDING TO AGE, AND HISTORY OF
PREVIOUS SCARLET FEVER

	Previous Scarlet Fever			No Previous Scarlet Fever			History Unknown			Totals
	Age: 0-14 yr.	15 + yr.	Totals	0-14 yr.	15 + yr.	Totals	0-14 yr.	15 + yr.	Totals	All Cases
Diagnosed scarlet fever	1	6	7	162	43	205	42	12	54	266
Undiagnosed scarlet fever	2		2	37	5	42				44
Tonsillitis	22	54	76	165	121	286	4	13	17	379
Upper respiratory infection	27	18	45	151	57	208	2	10	12	265
No illness	111	609	720	705	1,601	2,306	15	255	270	3,296
Totals	163	687	850	1,220	1,827	3,047	63	290	353	4,250

FREQUENCY PER 100 CONTACTS

	Previous Scarlet Fever			No Previous Scarlet Fever			History Unknown			Totals
	Age: 0-14 yr.	15 + yr.	Totals	0-14 yr.	15 + yr.	Totals	0-14 yr.	15 + yr.	Totals	All Cases
Diagnosed scarlet fever	0.6	0.9	0.8	13.3	2.4	6.7	66.7	4.1	15.3	6.3
Undiagnosed scarlet fever	1.2		0.2	3.0	0.3	1.4				1.0
Tonsillitis	13.5	7.9	8.9	13.5	6.6	9.4	6.3	4.5	4.8	8.9
Upper respiratory infection	16.6	2.6	5.3	12.4	3.1	6.8	3.2	3.4	3.4	6.2
No illness	68.1	88.6	84.7	57.8	87.6	75.7	23.8	87.9	76.5	77.6

not always possible to verify this, because of residence in another city at the time, failure to remember the date, or other factors. One of the 7 persons was a child, of 163 children previously stated to have had scarlet fever. Of 687 adults with a history of previous scarlet fever, 6 had attacks in the course of these observations. The attack rates are essentially the same for both children and adults with a previous history of the disease (respectively 0.6 and 0.9 per cent). For those who presumably had not had scarlet fever the attack rate was 13.3 per 100 children and for adults 2.4. The differences are significant and indicate the general reliability of histories. In this connection, it may be noted that for primary cases of this series, 18 gave a history of previous attack (1.6 per cent), almost twice the proportion observed for secondary cases—17 were children. Even with allowance for inaccuracy of histories, second attacks of scarlet fever are seemingly more frequent than commonly supposed.

The rate for undiagnosed scarlet fever

was for children 3.0 per cent and for adults 0.3. In the 2 instances with a history of previous attack the attending physician stated that if he had not seen the child previously with the same illness he would certainly have called the present illness scarlet fever.

Combining both diagnosed and undiagnosed scarlet fever infections, the secondary attack rate for children with previous history of the disease was 1.8 per cent and for adults 0.9 per cent. For those without knowledge of previous scarlet fever the rates were 16.3 for children and 2.6 for adults. The total secondary case rate was 7.3 per cent.

A not inconsiderable number of exposed contacts had upper respiratory infections subsequent to the appearance of scarlet fever in the family. There is no really significant difference between the number of such infections that developed among persons with a history of previous scarlet fever, and among those who had not had the disease. These infections were more commonly accompanied by hemolytic

streptococcus invasion than not; also the proportion of those with hemolytic streptococci in cultures from the nose and throat was greater in the group who had had scarlet fever. The number in the latter group who contracted scarlet fever was naturally smaller. With less rigid requirements for determination of undiagnosed scarlet fever, some of these infections on purely clinical grounds would have been so classified.

Information concerning immunity to scarlet fever as judged by the Dick test, is available for a considerable proportion of the contacts in this series. The

technic of making the tests was that commonly employed. Particular attention was directed to preparation of syringes and needles, in order to avoid emphasized sources of error. The material for the test was supplied by the State Department of Health Laboratories. The tests were read after 22 to 26 hours, with results of positive and questionable tests recorded by actual measurement of the involved area of skin. Data presented in Table VI are limited to tests performed shortly after the entrance of scarlet fever into the family, with the further provision that the contact had had no recent ante-

TABLE VI

ILLNESSES IN INDIVIDUALS EXPOSED TO SCARLET FEVER, ACCORDING TO REACTION TO DICK TEST AND HISTORY OF PREVIOUS SCARLET FEVER

	0 - 14 years					
	Dick Positive			Dick Negative		
	Previous Scarlet Fever	No Previous Scarlet Fever	History Unknown	Previous Scarlet Fever	No Previous Scarlet Fever	History Unknown
Diagnosed scarlet fever	1	51	..	..	6	1
Undiagnosed scarlet fever	..	13	..	..	1	..
Tonsillitis	1	40	1	1	12	..
Upper respiratory infection	1	55	..	3	11	..
No illness	11	239	2	23	88	..
Totals	14	398	3	27	118	1

	15 + years					
	Dick Positive			Dick Negative		
	Previous Scarlet Fever	No Previous Scarlet Fever	History Unknown	Previous Scarlet Fever	No Previous Scarlet Fever	History Unknown
Diagnosed scarlet fever	1	6	..	..	4	1
Undiagnosed scarlet fever	..	1	..	..	2	..
Tonsillitis	5	10	2	1	16	3
Upper respiratory infection	1	2	..	5	8	1
No illness	11	107	5	146	344	46
Totals	18	126	7	152	374	51

cedent illness. Many additional tests were made, but excluded for these reasons. The Dick reaction is known for 1,289 persons who met these requirements. The group includes 561 children and 728 adults (Table VI).

Of persons with no history of having had scarlet fever, 79.7 per cent reacted positively to the Dick test for ages under 5 years; for ages 5 to 9, 79.3 per cent; for ages 10 to 14, 69.0 per cent; and for adults in excess of 15, 25.2 per cent. The attack rate for scarlet fever among persons with a known positive Dick reaction was for children 12.5 per cent and for adults 4.6 per cent. If to the group with recognized and reported scarlet fever infections there are added those who had undiagnosed scarlet fever, the attack rate for children with Dick positive reactions is 15.4 per cent and for adults, 5.3 per cent.

Twelve persons with an original negative Dick reaction contracted scarlet fever; 7 among 146 children, and 5 among 577 adults. The difference between the attack rate for persons with positive tests is pronounced. Most

observers who have reported on the frequency of scarlet fever among groups who have been Dick tested, have recorded some few cases among persons who reacted negatively. Considering the age distribution and the intimacy of exposure in family groups, the number of cases among negative reactors, although somewhat more than average experience, is not excessive.

When a person had a positive Dick test and hemolytic streptococci were demonstrated in cultures from the nose or throat at the time of the original investigation, the proportion who subsequently contracted nonspecific illnesses of the tonsillitis and upper respiratory type was 17.5 per cent. Those with positive Dick tests but no demonstrated hemolytic streptococci later had illnesses of this nature in 16.0 per cent (Table VII).

IMMUNITY REACTIONS

What is the end result in regard to immunity, the aftermath of scarlet fever infection in these families? A large group of persons, 1,412, for all practical purposes can be considered to have

TABLE VII
ILLNESS IN CONTACTS EXPOSED TO SCARLET FEVER, ACCORDING TO DICK REACTIONS
AND CULTURES FOR HEMOLYTIC STREPTOCOCCI

Investigation culture:	Dick Positive						Dick Negative					
	Age:											
	0-14 yr.			15+ yr.			0-14 yr.			15+ yr.		
	+	-	N T	+	-	N T	+	-	N T	+	-	N T
Diagnosed scarlet fever	14	34	4	..	6	1	1	5	1	..	5	..
Undiagnosed scarlet fever	3	10	..	1	..	..	..	1	..	1	1	..
Tonsillitis	12	29	1	2	14	1	4	9	..	5	15	..
Upper respiratory infections	16	32	8	..	3	..	5	9	..	1	13	..
No illness	33	186	33	16	98	9	22	86	3	59	457	20
Totals	78	291	46	19	121	11	32	110	4	66	491	20

NT = Not taken

TABLE VIII
INDIVIDUALS ORIGINALLY DICK POSITIVE
WHO WERE RETESTED 2 MONTHS AFTER EXPOSURE TO SCARLET FEVER

	Intermediate Illness								
	Diagnosed Scarlet Fever	Undiagnosed Scarlet Fever		Tonsillitis		Upper Respiratory Infection		None	
Hemolytic Streptococci:		+	-	+	-	+	-	+	-
Number observed	7	6	5	24	23	17	21	45	180
Number becoming negative	5	4	4	14	13	10	9	12	19
Per cent becoming negative	71.4	66.7	80.0	58.3	56.5	58.8	42.9	26.7	10.6

developed immunity to the disease through having had an attack of scarlet fever. Many others were immune before scarlet fever entered the home. Particular interest attaches to the supposedly susceptible persons who did not contract the disease. A goodly number of these initially had a positive Dick test. Not a few were found to react negatively to this test after 2 months, without having had recognized scarlet fever infection. Persons judged susceptible and subsequently contracting tonsillitis while scarlet fever was in the home, developed immunity in about 60 per cent of instances, as determined by the change from a positive to a negative Dick reaction. The number was essentially the same, whether or not hemolytic streptococci had been demonstrated at the time of the original exposure.

The proportion who became Dick negative is rather striking because, of a group of patients with known scarlet fever (18), tested under the same conditions, 72 per cent changed from a positive to a negative Dick reaction. This number is small, but the result is supported by observation of

another group of more than 200 patients with scarlet fever and an initially positive Dick test; those reacting negatively when tested shortly after the appearance of the eruption being excluded.

The number of Dick positive reactors who became negative after having had an upper respiratory infection was slightly less, 50 per cent. If streptococci were demonstrated when first exposed, or during the illness, the proportion which became Dick negative was almost as great as for persons with actual scarlet fever. When streptococci were not demonstrated the Dick test became negative in 43 per cent (Table VIII).

Especial interest attaches to those who had no illness whatsoever during the time that a patient with scarlet fever was in the home. Nevertheless, 14 per cent had a change from a positive to a negative Dick reaction. When hemolytic streptococci were demonstrated, 26.7 per cent became negative to the test; in the larger group where hemolytic streptococci were not demonstrated, 10.6 per cent. These observations are significant in support of the

theory of latent immunization, a belief largely based upon epidemiological behavior of disease and not actual proof of immunity relationships before and after exposure. This evidence contributes to a quantitative evaluation of the phenomenon; the effect that can be expected from a relatively intimate exposure.

Information is not at hand concerning the permanency of this change from a positive to a negative reaction. Some few found to be negative 2 months after the original exposure are known to have become positive again, by retests made 2 years later. In Table VI it was shown that persons who gave a history of previous scarlet fever did not always have negative Dick tests; 32 of 211 were positive. It is known that not all patients convalescent from scarlet fever have developed a negative Dick reaction when tested at the end of 30 days. Various observers have noted persistent positive Dick reactions under such conditions varying from 5 to 40 per cent. It is quite possible that a Dick test, which has been negative shortly after scarlet fever, may again become positive as immunity varies from time to time. That is known to happen after active immunization by scarlet fever toxin. The same phenomenon may be concerned in these infections, and the test of whether or not permanent immunity actually developed will be found in the further history of these children in regard to scarlet fever.

SUMMARY

An urban population of 5,352 individuals, comprising 1,097 families invaded by endemic scarlet fever, had a secondary attack rate of 7.3 per cent. This includes diagnosed and undiagnosed cases.

Presumptive evidence is presented to indicate that many times scarlet fever first appears in the home as a simple upper respiratory infection, presumably

in an immune or partially immune person, from whom the infection is transmitted in the form of classical scarlet fever to a non-immune individual.

Failure to recognize scarlet fever when first it appears in families contributes distinctly to an increased secondary case rate. The function of the undiagnosed case in transmission of the infection is important; 31.6 per cent of secondary cases were due to that cause.

There is excellent support for the belief that in general scarlet fever is a disease largely transmitted by carriers rather than by cases. This, however, is not true of familial scarlet fever, because as many secondary cases were found to arise from exposure to the acute infection as from contact with healthy or convalescent carriers.

Upper respiratory infections including tonsillitis are relatively prevalent among persons recently exposed to scarlet fever.

Evidence is introduced that many of these infections are associated with a developing immunity to scarlet fever, judged by the Dick reaction. This occurred in the present experience to an extent comparable to that with clinical scarlet fever.

Latent or sub-clinical infection was the probable explanation of the immunity which developed in 14.8 per cent of contacts to patients with scarlet fever. This occurred more commonly when hemolytic streptococci were demonstrated in cultures from the nose and throat. Indication is given of its relative importance in establishing the progressive increase in immunity known to occur with advancing age and without disease.

An attempt has been made to evaluate quantitatively the relative importance of case to case infection, missed cases, larval infections, and carriers in the transmission of scarlet fever.

From the standpoint of public health

administration, 3 things can be emphasized. Need exists for earlier recognition and isolation of cases. Too many secondary infections arise from this deficiency. When secondary cases occur in families, the interval is usually short. This substantiates the recent

emphasis on a shorter period of isolation as being equally effective. In sharp outbreaks of scarlet fever, measures should be developed for the brief restriction of persons, particularly familial contacts, who have sore throat or other infections of the upper respiratory tract.

Soviet Plans Medical Zoo

A MAMMOTH zoölogical garden whose inhabitants will annually be sacrificed to the cause of science at the rate of 9,000 dogs, 7,000 cats, 21,000 rabbits, and 16,000 porpoises will be only one feature of the new medical center which the Soviet plans to start building on the outskirts of Moscow this coming spring, according to a dispatch from Moscow to *New York Sun*.

According to plans this will be the medical center of medical centers, and will automatically bring the Soviet Union to the front in the field of experimental medicine. The entire layout will cover about 1,000 acres, comprising separate but coördinated institutes devoted to research in morphology, physiology, psychology, biophysics, biochemistry, and pathology.

The headquarters building will contain a library of 600,000 volumes and an auditorium seating 1,500 people. A clinic will contain 600 beds and there will be almost one laboratory for every patient, allowing the maximum amount of attention to each case. Apart from the laboratories and clinic will be a section of apartment buildings to accommodate 12,000 people including 5,500 doctors, research workers, and nurses.

One of the ultra-modern features of the center will be a laboratory in which healthy patients may be subjected to the atmospheric conditions of various climates, ranging from the arctic to the

subtropics, while doctors study their reactions. Thus it will be possible to determine, theoretically at least, what diets are best in various climates for people engaged in various activities.

In the "clinic of healthy and sick man" scientists will determine the effect upon people in various states of health of working, eating, and sleeping.

Before drawing up plans for this ambitious center the All Union Institute of Experimental Medicine sent a commission to the United States to study the work of the medical centers at Cornell and Columbia and the Rockefeller Institute, and it is probable that a representative of the New York city health commission will visit Moscow next spring to give consultation.

While the Soviet Union is still greatly handicapped in the field of practical medicine by lack of capable physicians and of medical supplies this condition has not been allowed to retard progress in the province of experimental medicine.

The plans of the Soviet for the development of the system of "state medicine" are almost limitless and the new medical center will form an indispensable part of the system.

The buildings and the equipment, some of which may be bought in the United States, will cost about 150,000,000 rubles. The center should be in full operation by 1939.—*New York State J. Med.* 35, 4:156 (Feb. 15), 1935.

Specific Expenditures and Personnel of Official Health Agencies in Certain Cities*

JOSEPH W. MOUNTIN, M.D., F.A.P.H.A.

U. S. Public Health Service, Washington, D. C.

IN the first article of this series dealing with the work of the Sub-committee on Current Practices of Health Departments, attention was called to the lack of any central body of up-to-date information on the status and practices of state and local health departments. Suggestions were made regarding the types of data useful to health administrators which could be collected on an annual basis without undue effort and at very low cost. These suggestions were based very largely on the experience of the Sub-committee on Current Practices of Health Departments in dealing with the data compiled in connection with the Inter-city Health Conservation Contest for the years 1930, 1931, 1932, and 1933.

These data have proved to be very valuable in portraying changes taking place in city health departments during a period when the demands for read-

justment were unusually great. In the first article it was pointed out that appropriations were maintained very well through the year 1931. In 1932 many cities reported decreases in appropriations but, for the most part, the amounts were small and it was possible to maintain programs by minor adjustments in budgets. But in 1933 very drastic reductions were experienced by most cities, often resulting in serious disorganization of staff and curtailment of service.

The schedule used in the contest of 1933 for the first time made provision for obtaining data on personnel which can be compared with those reported by other agencies for previous years. Some of these data together with expenditures of health departments for specific services will now be considered.

EXPENDITURES BY FUNCTIONS

In attempting to allocate expenditures to functions, considerable difficulty was encountered. Definitions of services and fiscal practices of the health departments entered in the contest could not always be reconciled with each other. Not infrequently, one worker might be employed on two or more activities, and yet, the salary might be paid out of only one appropriation item. The following examples may be cited: The health officer may also be

* Second article based on Report of Sub-committee on Current Practices of Health Departments of the Committee on Administrative Practice. The author is Chairman and the other members are: E. L. Bishop, M.D., Louis I. Dublin, Ph.D., Allen W. Freeman, M.D., George T. Palmer, Dr.P.H., and John L. Rice, M.D.

The tables and references in this article have been numbered to follow consecutively those presented in the first article of the series, "A Central Information Service on Current Practices of Health Departments," Joseph W. Mountin, M.D., *American Journal of Public Health*, Mar., 1935.

TABLE IV

PER CAPITA IN CENTS AND PERCENTAGE DISTRIBUTION OF EXPENDITURES BY OFFICIAL AGENCIES FOR SPECIFIED HEALTH SERVICES * FOR THE YEAR 1933

<i>Activity</i>	<i>Number of Cities Reporting</i>	<i>Average Per Capita</i>	<i>Per Cent of Total</i>	<i>Minimum Per Capita</i>	<i>Maximum Per Capita</i>
Administration	53	5.72	8.55	1.7	28.2
Vital Statistics	46	1.50	2.24	0.4	11.8
General Sanitation	46	8.31	12.42	1.4	25.1
Food, Drugs, Milk	53	10.14	15.15	3.1	21.5
Child Health Supervision †	54	19.92	29.76	2.9	65.3
Communicable Disease	36	7.30	10.91	0.7	11.9
Tuberculosis	35	7.25	10.83	0.6	14.0
Venereal Disease	42	2.78	4.15	0.4	17.8
Laboratory	51	4.01	5.99	0.4	18.2

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal, and capital expenditures and deficits

† Board of Education expenditures included

chief of the bureau of communicable disease, but that function may not be carried on a specific appropriation; inspectors paid out of an appropriation for general sanitation may do some milk control work; in some cities operating expenses are considered administrative charges, while in other places such items are apportioned among the several bureaus. Either plan just described may be followed with regard to certain common services such as clerical assistance, communication and transportation, and minor repairs or replacements. The figures assembled on expenditures by services during 1933 nevertheless are presented since it is believed they at least indicate the manner in which funds are being allocated among functions. The Sub-committee on Current Practices of Health Departments is now developing definitions of services and methods of cost accounting which will make possible more detailed types of analyses in the future.

The wide variation between minimum and maximum expenditures for the several items of service may be due in part to the relative importance attached locally to them, but it is probable that these variations arise more often from lack of uniformity in definitions and

methods of accounting. The figures on administration particularly should be taken with considerable caution. In spite of instructions to reserve this item for the purely administrative functions of the health commissioner's office, it is believed to be weighted with operating expenses and perhaps with communicable disease control. In the smaller cities especially, the health officer may be chief of the bureau of communicable disease. The figures on communicable diseases, when given, especially by the large cities, perhaps represent true expenditures for that purpose. It is strange however that expenditures for this basic activity are reported less frequently than for any service except tuberculosis. Communicable disease control is probably included under administration by those cities failing to report expenditures specifically for that purpose. Some overlapping may exist between general sanitation and control of food, drugs, and milk, since there may be unified direction of these related services, or the field inspection may be performed by the same persons working on a generalized district basis. The figures given for vital statistics, venereal diseases, and laboratory are apt to represent absolute expenditures. Child

health supervision, tuberculosis, and communicable disease control are perhaps heavily weighted with public health nursing, but it seems quite probable that in many instances nursing has not been correctly distributed over these and other services in proportion to the time actually spent on each.

It was possible to separate the costs of nursing from the general public health program in the schedules submitted by 26 contest cities for the year 1933. The great majority of these cities reported expenditures for nursing ranging between 12 cents and 25 cents per capita. In 4 cities, the amount fell below 10 cents; one small city, however, reported the highest expenditure, 67.6 cents per capita. The per capita expenditures for nursing by cities in different population groups are shown in Table V.

the Committee on Administrative Practice. The figures are presented in Table VI. There has been an increase of approximately 10 cents per capita in the expenditures of 1933 as compared with those reported ten years previously. However, as pointed out in the first article of this series, there may have been some selection by the contest of cities with high expenditures. In comparing per capita expenditures of 1933 with 1923 fairly large increases will be noted for certain services while others remain constant or show some decline. Amounts for the support of tuberculosis, venereal diseases, and food, drugs, and milk control have been increased more than for other services. Slight gains are made by general sanitation and child health supervision, but administration, vital statistics, communicable disease

TABLE V
PER CAPITA EXPENDITURES FOR NURSING BY CITIES GROUPED ACCORDING TO POPULATION

Group	Number of Cities	1933 Per Capita Expenditure (Cents)
I. 500,000 and over	4	11.96
II. 250,000 to 500,000	4	9.02
III. 100,000 to 250,000	5	17.53
IV. 50,000 to 100,000	5	19.30
V. 20,000 to 50,000	4	15.60
VI. Under 20,000	4	19.77

The extremely low per capita expenditure reported by one city in Group I and the very high figure given by another city in Group IV seriously distort the combined expenditures for these two groups of cities. No reason can be assigned for the extremely low per capita figures for cities in Group II. It is not possible to express the average per capita expenditure of all cities with any great degree of accuracy since such a figure would be unduly influenced by the high percentage of the population in the large cities.

By selecting comparable cities it is possible to make rough comparisons of the expenditures reported by contest cities with expenditures reported in 1923 and with those recommended by

control and laboratory service sustained a slight loss.

The per capita expenditures of contest cities for general sanitation and the control of foods, drugs and milk approach the amounts given as adequate in *Community Health Organization*. The per capita expenditures for all other services are far below the standards recommended in the publication quoted.

By referring to Table VI it may be observed there is a striking similarity in the percentage distribution of the budget among the several items of service reported by contest cities and as given in *Public Health Bulletin 164* for the year 1923. In *Community Health Organization* it is recommended that a larger percentage of the budget be de-

TABLE VI

DISTRIBUTION OF EXPENDITURES ACCORDING TO SERVICES BY CONTEST CITIES, BY CITIES LISTED IN *Bulletin 164*, AND AS RECOMMENDED IN COMMUNITY HEALTH ORGANIZATION

Activity	Contest Cities		Cities Listed in <i>Bulletin 164</i> *		Community Health Organization †	
	Per Capita (Cents)	Per Cent of Total	Per Capita (Cents)	Per Cent of Total	Per Capita (Cents)	Per Cent of Total
Administration	5.72	8.55	5.99	10.40	19.45	11.57
Vital Statistics	1.50	2.24	1.53	2.66	5.02	2.99
General Sanitation	8.31	12.42	6.56	11.38	10.30	6.13
Food, Drugs, Milk	10.14	15.15	7.47	12.96	12.70	7.55
Child Health Supervision . . .	19.92	29.76	18.43	31.99	70.43	41.90
Communicable Disease	7.30	10.91	8.19	14.21	16.55	9.84
Tuberculosis	7.25	10.83	3.96	6.87	12.23	7.28
Venereal Disease	2.78	4.15	1.47	2.55	11.06	6.58
Laboratory	4.01	5.99	4.02	6.98	10.35	6.16
Total	66.93	100.00	57.62	100.00	168.09	100.00

* Municipal Health Department Practice for the Year 1923, *Pub. Health Bull. 164*, p. 38, Table IV, "Public Health Nursing" (per capita cents 1.39) excluded when not distributed among other items.

† *Community Health Organization*, Table VIII, "Public Health Nursing," redistributed among other services according to Table III, "Bedside Care Excluded."

voted to child health supervision than was the actual practice in either 1923 or 1933. It must be understood however that the budget recommended in *Community Health Organization* is nearly 3 times what was actually available in either 1923 or 1933. Furthermore it is only after health departments have taken care of prescribed regulatory duties that consideration can be given to preventive activities having a large element of personal service and which are not as yet so well established.

PERSONNEL EMPLOYED

The schedule used in connection with the contest of 1933 made provisions for reporting the number of employees according to certain professional classes and time devoted to official duty. The employment of physicians, nurses, and engineers was selected as a criterion for determining the extent to which staffs have been professionalized, first because programs of practically all health departments embrace medical, nursing, and sanitation activities, and second because the educational requirements for ad-

TABLE VII

NUMBER OF CONTEST CITIES ACCORDING TO POPULATION GROUP EMPLOYING PHYSICIANS, NURSES, AND ENGINEERS FOR THE YEAR 1933

Group	Number of Cities Reporting	Number Employing Physicians		Number Employing Nurses		Number Employing Engineers	
		Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time
I. 500,000 and over	9	9	7	9	1	4	1
II. 250,000 to 500,000	13	11	10	13	3	3	0
III. 100,000 to 250,000	17	14	16	16	3	3	1
IV. 50,000 to 100,000	16	12	15	16	3	3	2
V. 20,000 to 50,000	13	5	11	10	4	0	2
Total	68	51	59	64	14	13	6

TABLE VIII

HEALTH DEPARTMENT PERSONNEL PER 100,000 POPULATION FOR THE YEAR 1933 AS
REPORTED BY 68 CONTEST CITIES

Group	Number of Cities Reporting	Physicians		Nurses		Engineers		Others		Total	
		Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time
I.	9	1.95	4.86	13.86	1.26	0.28	0.04	16.09	2.05	32.18	8.21
II.	13	1.52	3.37	7.54	0.07	0.07	0.00	14.80	0.34	23.93	3.78
III.	17	1.74	3.97	7.76	0.52	0.26	0.04	17.21	0.96	26.97	5.49
IV.	16	1.45	8.70	9.28	0.29	0.19	0.10	14.31	2.32	25.23	11.41
V.	13	1.60	5.25	7.30	2.05	0.00	0.46	11.18	3.19	20.08	10.95

mission to these professional classes are fairly well established. The number of cities employing full-time and part-time personnel is given in Table VII. It may be noted that of the 68 cities supplying data satisfactory for analysis, 51 employ full-time physicians, 64 full-time nurses, and 13 full-time engineers. Nursing service for the most part appears to have been put on a full-time basis. More than half the cities in Group V rely exclusively on part-time physicians, and presumably the same cities employ part-time health officers. Sanitation, a well established and basic activity of health departments, apparently continues on a non-professional basis in the majority of cities since only 13 of the 68 cities employ full-time engineers. The information on cities in Group VI was not satisfactory for analytical purposes.

The number of employees in relation to a definite unit of population is given in Table VIII. A unit of 100,000 population is taken as a base in order to compare the contest figures with those of other studies. The larger cities, as may

be judged from these figures, employ the greatest number of both professional and non-professional people. There is a striking similarity in the numbers of full-time physicians and nurses employed by cities falling into Groups II, III, IV, and V. The smaller cities apparently favor the employment of part-time personnel more than do the cities in the larger population groups. This table also shows the lack in professional direction of sanitation as indicated by a low ratio of engineers to the population.

The classification of personnel used in *Public Health Bulletin 164* differs in many respects from that used for the contest cities. It is possible however to make direct comparisons between the number of physicians, nurses, and total employees in the cities falling into Groups I, II, and III. This is done in Table IX.

According to the data presented in Table IX, there has been some increase in the total number of employees by cities of Groups I and III for the year 1933 as compared with 1923. The most

TABLE IX

NUMBER OF PHYSICIANS, NURSES AND TOTAL EMPLOYEES PER 100,000 POPULATION
IN CONTEST CITIES AND CITIES REPORTED IN *Bulletin 164*

Group	Contest Cities						Cities Listed in Bulletin 164					
	Physicians		Nurses		Total Employees		Physicians		Nurses		Total Employees	
	Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time	Full- Time	Part- Time
I..	1.95	4.86	13.86	1.26	32.18	8.21	0.62	5.26	8.02	0.00	21.01	6.52
II..	1.52	3.37	7.54	0.07	23.93	3.78	0.93	5.11	6.67	0.00	23.60	5.44
III..	1.74	3.97	7.76	0.52	26.97	5.49	0.89	4.31	6.47	0.00	20.97	5.38

significant figures are believed to be those regarding the increase of full-time physicians in the contest cities of all three groups, first on account of the relative size of the increase, and second because physicians are apt to be employed in positions of responsibility. The increase in the number of full-time nurses also is encouraging although the relative gain is not so great as that reported for full-time physicians. Unfortunately comparative figures on engineers for 1923 were not available.

SUMMARY

An analysis of the data made available through the Inter-city Health Conservation Contest shows a wide variation between maximum and minimum expenditures for specific activities by official health agencies in cities. For example, the per capita expenditure for child health supervision ranges from 65.3 cents to a low point of 2.9 cents; communicable disease control from 11.9 cents to 0.7 cent, and administration from 28.2 cents to 1.7 cents. It is probable that some of the variation in

expenditures arises from a lack of uniformity in definitions of services and methods of accounting. The Subcommittee on Current Health Department Practices is developing definitions for services and methods of cost accounting which will make possible a more satisfactory type of analysis than can be made with data available at the present time.

An analysis of health department personnel indicates that the larger cities employ the greatest number of workers per 100,000 population. A comparison of the 1933 figures with those of 1923 shows a decided increase in the number of full-time physicians employed. Sanitation still consumes a large part of the budget of municipal health departments but this important service, with comparatively few exceptions, has not been placed under the direction of graduate engineers.

REFERENCES

- Municipal Health Department Practice for the Year 1923, *Pub. Health Bull.* 164. Government Printing Office, 1926.
Community Health Organization, The Commonwealth Fund, New York, 1932.

Health Exhibits

THERE are several famous health museums in foreign countries. There were none of note in this country till November, 1934. During that month a movement to give America its own museum of hygiene got under way in Chicago.

With but one exception (a foreign exhibit) all medical and health exhibits of the Century of Progress will be placed permanently in the large Rosenwald Museum. It should become a factor in teaching health.—*California & West. Med.* 42, 2:129 (Feb.), 1935.

Trend in Public Health Nursing*

PEARL McIVER, R.N., F.A.P.H.A. (*Life Member*)

*Associate Public Health Nursing Analyst, U. S. Public Health Service,
Washington, D. C.*

THE public health nursing movement in the United States is approximately 50 years old. Its growth has been rapid, especially during the past 20 years. When the National Organization for Public Health Nursing was organized in 1912, there were only 3,000 public health nurses in the United States. Today, there are approximately 20,000 public health nurses. But in spite of this tremendous increase, there is a distinct need for more public health nursing service in both rural and urban areas of practically every section of the country.

CHARACTERISTIC TREND AT PRESENT TIME

The most characteristic trend in the present public health nursing movement is the tendency toward a critical self analysis—a desire to evaluate the past and present public health nursing practices and accomplishments in terms of proven value. At no time in the history of public health nursing has there been as much available material as there is at present.

The survey conducted by the N.O.P.H.N.¹ gives an excellent picture of a cross-section of average public health nursing practice in both official and nonofficial agencies, in rural and

urban areas, from the east, west, north, and south sections of the country.

The Nursing Studies Division of the Milbank Memorial Fund² has given us some excellent detailed analyses of nursing in three selected health organizations, a county health department, a medium sized city health department, and a district of a large city health department. These studies are especially valuable in determining the effect of generally accepted practices and in helping to plan an economic distribution of nursing time.

The U. S. Public Health Service, through its studies of public health administrative methods, is prepared to give an accurate picture of the distribution and nature of the nursing service in a number of county health departments. These are, especially significant because they have been carried on concurrently with studies of the work of the health officers and sanitary officers, and it will therefore be possible to show how public health nursing work is correlated with all of the other public health activities of the community.³

Under the direction of Teachers College, Columbia University, New York, the writer was privileged to make an analysis of public health nursing in 10 selected health organizations. This study differs from the others mentioned in that a definite effort was made to include only "superior" public health organizations and the most successful nurses employed by those organizations.

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

The findings are especially interesting when compared with the findings of the N.O.P.H.N. survey which represents average practice.⁴

There are also numerous less intensive surveys and analyses of public health nursing services in local areas, but those mentioned are sufficient to show that public health nurses are concerned with the analysis of their own progress and accomplishments. The first step toward increased accomplishments is the recognition of weaknesses in past practices, and a conscientious effort to promulgate those which have been productive, and to eliminate or modify those which have not produced desirable results. Consequently, some of the traditional conceptions of public health nursing are undergoing changes.

INSTANCES WHICH APPEAR TO INDICATE A CHANGING CONCEPTION OF PUBLIC HEALTH NURSING

1. There has been a shift in emphasis from the private to the official public health nursing agency. Public health nursing was initiated and largely developed by the private or nonofficial agency. The private agency was the leader in developing standards and in improving practice for many years. Recent surveys show that a greater number of nurses are now employed by official than by nonofficial agencies and that the official agency in many sections of the country is assuming leadership in the promotion of public health nursing.

2. There is a tendency toward an amalgamation of public health nursing agencies. Since public health nursing was initiated and largely developed by the private agencies, it is not surprising to find still a multiplicity of agencies in some communities. Therefore, the N.O.P.H.N. Survey Committee recommends that an effort be made to combine nursing agencies, that there never be more than two public health nursing

agencies, one official and one nonofficial, in any community, and that experiments be made in rural and small urban areas with but one agency responsible for all public health nursing work.

3. Community needs are being recognized as the keynote in planning public health nursing programs. Many such programs have in the past been based upon "agency facilities" instead of community needs. A tuberculosis program was planned because the community had some "Seal Sale" money; a school inspection program was undertaken because the nurse liked to do that type of work; or an infant hygiene program was instituted because the largest contributor was primarily interested in babies. Each agency appeared to be satisfied with its own special program and only incidentally concerned with the other health problems in the community. This procedure is still common in many communities, but there is a trend toward community planning from broader aspects which is significant.

4. Official as well as nonofficial agencies must recognize the importance of citizen participation in the public health program. Health councils and central planning committees are essential elements in the successful operation of any public health program. The N.O.P.H.N. survey showed that official agencies in particular have not made as much progress in this direction as is desirable. As stated, there is need for considerably more public health nursing service than is now available. Adequate financial support is dependent upon the wholehearted endorsement of the receiving public. The need for citizen participation in the promotion of private public health nursing agencies has long been acknowledged. It is being recognized as equally essential to the official public health nursing agency.

5. The quality of the performance of nurses in certain phases of the generally accepted public health nursing

program is quite unsatisfactory. For years we have glibly spoken of the public health nurse as a teacher. The interpretation of the medical, sanitary, and social procedures has been listed as her greatest contribution. In determining quality of performance, the N.O.P.H.N. Survey Committee rated every nursing visit observed on 4 factors:

1. Approach—The ability to meet people, to establish a friendly relationship, and to adjust to various situations.

2. Nursing technic, her understanding of the underlying principles, the relative importance of the various steps of her technic to the well-being of the patient.

3. The adequacy of the care given. Was everything that was indicated done for the patient upon that visit?

4. The teaching, both direct and indirect. Did the nurse recognize opportunities for teaching? was her instruction accurate? and was it suited to the needs of those who were instructed?

Considering these 4 factors—approach, technic, adequacy of care, and teaching—it was a severe jolt to many of us to find that teaching received the lowest rating for all types of organizations and for all types of service. Approach was rated highest in every case. It is, therefore, quite evident that the majority of our nurses are not well qualified to do that which is considered one of the most important features of their work, namely, teaching of health.

6. There is a change in the meaning of the term "educational work." Many official organizations have stated emphatically that their nurses do "educational work" only, meaning that they give no nursing care. The modern school teacher has long since given up the idea that her teaching will be effective if it is "by word of mouth" only. The nurse who thinks she can tell a mother how to care for a typhoid fever patient as effectively as she can demonstrate that technic, is out of date. Likewise, the public health nurse who gives nursing care to the typhoid fever pa-

tient and does not explain each step of the procedure to the mother or other attendant, or who continues to give that care after the attendant has learned how to do it correctly, is equally inefficient. However, service is a valuable partner to advice, and real "educational work" demands both. Is it not probable that the tendency on the part of some of the official relief agencies to set up public health nursing programs, independent of the existing health authorities, may be traced to the failure of the health departments to recognize the educational value of nursing service?

RECOMMENDATIONS IN REGARD TO FUTURE DEVELOPMENTS IN PUBLIC HEALTH NURSING

1. If the emphasis is to be shifted from the private to the official public health nursing agency, departments of health must be awake to their opportunities and be willing to assume the responsibility for leadership. Some public health officials are of the opinion that the rendering of nursing care to the sick is not a legitimate public health function, and as a consequence, they have completely excluded it from their programs. Good nursing care in acute illnesses and for maternity cases is an important factor in saving lives and in improving the health of hundreds of citizens in every community every year. Private duty nursing will never solve the problem, especially in rural or small urban areas. Some other provision must be made for indigent families and for those families who are not classed as indigent, but who have limited financial resources. If there is to be an amalgamation of public health nursing agencies, and if the official agency is to assume the entire responsibility for public health nursing work, especially in rural areas, health commissioners must be cognizant of all of the health needs of the people in their communities and be willing to help to meet those needs.

Our definition of public health functions must be broad enough to meet the health needs of the people or it will become necessary for other agencies to establish public health nursing programs.

2. In the past, public health nursing was frequently developed as a separate entity. Nursing leaders now recognize that it should be developed as an integral part of the entire community public health program. The successful public health nurse, who has been adequately prepared for her job, is an ideal interpreter of medical, sanitary, and social procedures. She is as much a help to the sanitary engineer and the social welfare worker as she is to the medical officer in keeping them informed regarding conditions she finds in the homes and schools and in interpreting their specialties to the families. Therefore, public health nursing should not be considered the prerogative of any medical specialty, such as child hygiene or tuberculosis control. The services of the public health nurse should be available to every division of the health department in accordance with the needs of those various divisions. Administratively, the nursing personnel, through a supervisor or director from their own ranks, should be directly responsible to the health commissioner or medical director. Thus the nursing service will become integrated throughout the entire public health program and the greatest good will be rendered to the greatest number.

3. We have not always given enough consideration to community needs and community desires in planning the public health program. In some of the more technical aspects of public health administration, such as safeguarding the public water supply, the public's need may be in opposition to the public's desires. The people may object to the taste of chlorine in the water and clamor for the kind of water they

formerly had. Health *needs* must, of course, be the deciding factor in such a controversy. However, except in emergencies when a delay in carrying out certain procedures might endanger many lives, the desires or "felt needs" of the people may be used as the basis for the introduction of more fundamental control procedures. It should be the aim of the health administrator to be thoroughly familiar with all of the health needs of the community and to encourage a better understanding of scientific public health procedures by relating those procedures to the recognized needs and common desires of the people.

4. Citizen participation in the health program, through health councils and planning committees, naturally follows. While mortality and morbidity records may be the more reliable index of community needs, the desires of the people as expressed by a representative group of laymen may often be a more sensitive index of real community needs. There was given before the Nursing Section of the American Public Health Association at Indianapolis last fall, an excellent paper on lay participation in a health program,⁵ in which were described the 3 steps or stages in successful lay coöperation. (1) learning about the health problems and what is being done to solve those problems; (2) participation through rendering volunteer service; (3) serving on advisory or planning committees. No one can be of any real value in the third capacity unless he has passed through the first 2 stages. I have found that these same steps are very valuable in securing the support of the practising medical profession. The country doctor may know very little about public health nursing and actually believe that he does not want to know much about it.

My experience in the promotion of rural public health nursing taught me to begin by visiting the doctor and

listening to his problems. Gradually, I would tell him about the functions of a public health nurse, and later, ask him to help me; not that his hurried inspection of 50 children in an hour really meant much, but because I wanted his advice on community health problems. I knew that the surest way to get him to consider those problems and to give me his advice was to get him interested through volunteer service. During the depression, many agencies depended upon volunteers for services usually performed by their staffs. The result has been that the accomplishment of the staff has increased considerably through being relieved of many non-professional functions, and the public's interest in the service has increased accordingly.

5. The N.O.P.H.N. survey has proved to us that there is much to be desired in the quality of the performance of the average public health nurse. Her teaching ability is limited, and her nursing technic is quite frequently unsatisfactory. Fortunately, there are a limited number of excellent public health nurses who are splendid teachers and who carry out the same perfect technic in the homes which they were taught in the hospitals, easily and habitually.

The writer's study of "best" public health nursing practices gives numerous illustrations of excellent teaching and faultless technic. The N.O.P.H.N. survey has proved that that quality of work is the exception rather than the rule throughout the country. What then must be done to improve the quality of public health nursing work? The first step appears to be the definition and the establishment of regulations concerning the qualifications of public health nurses. The N.O.P.H.N. and the Committee on Personnel Qualifications of the American Public Health Association have adopted the same minimum requirements. These require-

ments are *minimum*—not *maximum*. Most of the 10 organizations included in the writer's study of best public health nursing practices had much higher requirements than these, yet, only a very small percentage of the agencies included in the N.O.P.H.N. survey had any special requirements other than registration as a graduate nurse. Public health nursing is a specialty, and graduation from a 3 year course in a school of nursing does not prepare a nurse to do efficient public health work.

The provisions of personnel regulations are not retroactive and do not, as a rule, apply to persons who are "on the job." Our next problem is, then, what to do with the mass of nurses who are now doing public health work but who are not adequately prepared for their jobs. First, the nurses should be encouraged to take advantage of extension work in public health nursing and the allied subjects when such opportunities are available; (2) health administrators should make every effort to relieve nurses who desire to improve themselves through summer courses, and should encourage others to follow this example; (3) adequate nursing supervision should be provided for every public health nurse.

The N.O.P.H.N. survey found that quality of performance was positively correlated with the amount and quality of the nursing supervision provided. Twenty-three per cent of the agencies included in the survey provided no nursing supervision for their staff nurses. Good supervision implies a good staff educational program. Even the well prepared public health nurse needs to be continually improving herself or she will get into a rut and the quality of her service will deteriorate. Good supervision keeps the staff nurse interested and enthusiastic in her work, eager to use her own initiative and alert to improve her own practices. It makes the staff nurse feel

that her best work has been appreciated and that anything less than her best efforts are not worthy of her. Nursing supervision of that type will yield good returns in the improvement of the quality of performance.

May I repeat the 6 recommendations concerning the future development of public health nursing in the United States?

1. Increase the leadership from the official health agencies and enrich the nursing programs offered by official agencies.

2. Experiment with the amalgamation of nursing agencies with the idea of placing all public health nursing service under one agency in rural and small urban districts, but with the complete utilization of all community resources.

3. Develop public health nursing as an integral part of the whole community health program, not as an entity in itself nor as a subsidiary of any one medical specialty.

4. Emphasize the importance of considering community needs and community desires as the basis for program planning.

5. Increase citizen participation in the entire public health program.

6. Improve the quality of Public Health Nursing—first, through clearly defining and rigidly enforcing minimum qualifications for public health nurses, and, second, through providing a sufficient amount and a high quality of nursing supervision.

REFERENCES

1. National Organization for Public Health Nursing. *Survey of Public Health Nursing*. Commonwealth Fund, New York, 1934.
2. Milbank Memorial Fund. *Quarterly Reports*, 49 Wall Street, New York, 1931 to 1934.
3. These studies will be published as a series during the latter part of this year and during 1935 in the *Public Health Reports*.
4. Available through the National Organization for Public Health Nursing, New York, 1934.
5. Dowling, J. D. The Use of Laymen in Official Public Nursing Programs. *A.J.P.H.*, 24, 8:880 (Aug.), 1934.

Hospital Morbidity Statistics

THE appearance of *Standard Classified Nomenclature of Disease* prompts Bolduan to revive his suggestion originally published in 1913, that hospital morbidity statistics should be classified, tabulated, and studied more extensively as a source of information concerning non-fatal and non-communicable diseases. His proposal is that coöperating hospitals should send "discharge certificates" to a central recording agency, on discharge of all patients these certificates specifying such items as age, sex, race, social condition, occupation, period of hospitalization, disease, complications, operations, etc. The data would be transferred at the central agency to punch cards, mechanically tabulated, and analyzed. It is held that the resulting information would be of value to hospital authorities as a guide in planning hospital facilities, and in evaluating medical and surgical

policies. Health authorities might obtain through such data, information concerning non-communicable morbidity, that would point the way to more efficient preventive measures. The need of such information is obvious. Inquiry is highly desirable to determine the degree to which hospital populations can throw light upon the health problems of the general population.

In 1933, the Minnesota Hospital Association approved a project along these lines on the proposal of Dr. H. L. Dunn, Director of the University Hospitals, Minneapolis. *Minnesota Journal—Lancet*, 54, 6:148-157 (Mar. 15), 1934). No doubt, experiments along these lines have been undertaken in other places.—C. F. Bolduan. *Hospital Morbidity Statistics*. Reprint series. Health Dept. New York City. 2nd ptg. 1934. See also editorial in *J.A.M.A.*, 104, 7:565 (Feb. 16), 1935.

Laboratory Examinations of Milk Handlers*

EARLE K. BORMAN, D. EVELYN WEST, AND
FRIEND LEE MICKLE, F.A.P.H.A.

*Assistant Director; Chief Microbiologist; and Director, Bureau of Laboratories,
State Department of Health, Hartford, Conn.*

BEFORE entering into the discussion of problems associated with the laboratory examination of milk handler specimens, we should fix firmly in our minds those factors associated with the production of milk which operate from time to time to produce milk-borne diseases, together with the epidemiological importance of these infections.

There are two important factors upon which the existence of milk-borne disease depends: (1) The presence of such diseases as bovine tuberculosis, *Brucella* infection, and certain types of mastitis in the dairy herd; and (2) the presence of carriers and cases of infectious disease among milk handlers. Instances of a milk supply becoming contaminated with pathogenic microorganisms by other means have been recorded, but in general these have not been of importance in the history of milk-borne disease. In discussing the problem at hand we are only indirectly concerned with the first factor although the laboratory has played a large part and will undoubtedly continue to play an even larger part in the campaign to eradicate diseases spread in this fashion.

Between 1880 and the end of 1933, 1,032 milk-borne outbreaks† of disease traced to human carriers and cases have

been reported in the United States. Among these are included outbreaks of septic sore throat caused by contamination of the milk with beta hemolytic streptococci from diseased udders since these organisms have most probably been transmitted to the dairy cattle by milkers. These outbreaks have involved 53,582 known cases with 1,045 known deaths. Undoubtedly, there have been many other outbreaks which did not come to the attention of health authorities. It is interesting to compare the number of these outbreaks occurring before 1910 with those occurring after. Only 272 outbreaks, 26.4 per cent of the total, are recorded before 1910, as compared with 760, 73.6 per cent of the total, between 1910 and 1933. This is undoubtedly due to a number of factors associated with increased public health activities, increased milk production, and the increase in milk consumers as a result of increasing population and education in nutrition. In this discussion we shall consider the statistics for the period 1910 to 1933 as the most reliable indication of the actual prevalence of milk-borne disease. A summary of the outbreaks traceable directly or indirectly to human contact with the milk during this period is given in Table I.

* Read at a Joint Session of the California Association of Dairy and Milk Inspectors and the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

† We are indebted to Leslie C. Frank of the U. S. Public Health Service for data on milk-borne outbreaks furnished this department.

TABLE I

<i>Disease</i>	<i>Number of Outbreaks</i>	<i>Number of Known Cases</i>	<i>Number of Known Deaths</i>
Typhoid Fever	574	8,459	406
Septic Sore Throat	81	26,773	226
Scarlet Fever	72	5,326	40
Diphtheria	33	1,083	11

Typhoid fever is the most prevalent outbreak caused by carriers or mild cases on a milk supply and diphtheria the least. Streptococcus infections, such as septic sore throat and scarlet fever, occupy an intermediate position. The average streptococcus outbreak has caused approximately 210 cases of disease as compared with approximately 15 cases in each outbreak of typhoid fever during the same time. There have been approximately 7 known deaths associated with every 10 outbreaks of milk-borne typhoid as compared with 17 in every 10 outbreaks of the streptococcus infections. The death rate per outbreak is almost twice as great for the streptococcus infections as for typhoid fever. There have been almost 4 times as many cases associated with streptococcus infections as there have been of typhoid (32,009 cases of streptococcus infections as against 8,459 cases of typhoid fever).

Comparative statistics for Connecticut are available from 1918 through 1933. During that time Connecticut had 19 outbreaks of typhoid and paratyphoid fevers traced to milk, with 256 known cases, while no outbreaks of milk-borne diphtheria occurred. Twelve milk-borne outbreaks of septic sore throat and scarlet fever occurred, resulting in 1,042 cases. The total number of cases of typhoid and paratyphoid fevers from all sources reported in Connecticut during this time was 4,106; of septic sore throat and scarlet fever, 52,530 (1,581 of the former, 51,949 of the latter). Thus, milk was the vector in 6.2 per cent of all cases of typhoid and para-

typhoid fevers, in 36 per cent of the septic sore throat cases reported and in 0.9 per cent of the scarlet fever cases. Of the combined number of cases of the two streptococcus infections 2 per cent were traced to milk. With 1 exception, all milk-borne outbreaks of disease have been traced to ungraded raw milk which is not subject to any regulation in regard to physical or laboratory examinations of milk handlers.

From these figures no one can doubt the urgent necessity for remedial measures designed to control and eradicate outbreaks of milk-borne infections, especially after having witnessed the demoralizing explosiveness with which a community may be stricken. It is recognized that efficient pasteurization of the milk supply, coupled with proper precautions to prevent its subsequent contamination, is the ultimate solution. However, the introduction of 100 per cent pasteurization on a state-wide basis is at present a very remote possibility in most states. Even pasteurized supplies need attention from health authorities. The potential menace of the presence of a carrier in a pasteurizing plant has been repeatedly demonstrated. A striking example is the outbreak in San Francisco in 1928. Educational methods have a place in the program for the elimination of carriers, but it would be foolhardy to expect the elimination of milk-borne outbreaks by that means alone. For these reasons, the State of Connecticut has resorted to periodic physical examinations of milk handlers supplemented at each examination by routine laboratory tests with considerable success in locating carriers and cases.

The Connecticut program was initiated to bring the joint efforts of medical and laboratory science to bear upon the source of the majority of outbreaks of milk-borne disease, *i.e.*, upon milk handlers who are carriers or cases, by

insisting that each handler of certain grades of milk be given periodic physical examinations by a licensed physician, and that this physician consider certain laboratory tests performed in an approved laboratory an integral part of his examination before certifying his opinion of fitness to handle milk. Experience has dictated certain changes in the requirements since 1927 and, in all probability, further changes will be made as necessity demands. We wish to emphasize that Connecticut requirements have been designed to give the maximum protection possible with available facilities under Connecticut conditions.

COST OF THE CONNECTICUT PROGRAM

In a previous publication¹ Connecticut requirements for periodic laboratory examinations of milk handler specimens and the laboratory methods involved were briefly described. The results obtained in 91,257 laboratory examinations over a period of 6 years and 5 months were reported. The cost of these tests to the state was estimated at \$48,000, making the average cost of detecting each of the 71 carriers found \$677. These figures were obtained by utilizing the average cost of an examination of any type made in these laboratories for the several years under study. It was pointed out that the estimated cost was considerably in excess of the actual cost, since many other types of examinations made were

more consuming of time and material than those on milk handler specimens. A study of the actual cost of this activity for 1933, when 24,487 examinations were made on milk handlers, has confirmed this viewpoint. This cost-survey has taken into consideration the amounts expended for salaries, materials, and overhead, plus a figure apportioned to this activity for depreciation of equipment, all summarized in Table II. The salary cost and the cost of materials are very nearly exact for this phase of our activities. The overhead and depreciation charges are probably high since these have been apportioned among various phases of the work of the laboratories by using the ratio of the number of examinations of this type to the total for the entire organization. The cost of making 24,487 examinations of this type in 1933 was \$7,966 and the average cost per examination on milk handler specimens was 32.5 cents. This figure is approximately two-thirds as great as that estimated on a different basis in the previous study. It is a reasonable assumption that this ratio between actual costs and those previously estimated has applied throughout the entire period during which periodic examinations on milk handler specimens have been made. This would reduce the amount expended on the 91,257 examinations between April, 1927, and August, 1933, to about \$35,000 instead of the \$48,000 previously estimated, and would make the

TABLE II

COST OF MAKING 24,487 LABORATORY EXAMINATIONS ON MILK HANDLERS IN 1933

<i>Itemized Cost</i>	<i>Laboratory Work Proper</i>	<i>Outfit Work</i>	<i>Wash-up and Sterilizing Work</i>	<i>Receiving, Reporting, and Records</i>	<i>Laboratory Administrative Work</i>	<i>Total for All Laboratory Activities</i>
Salaries	\$3,509	\$152	\$456	\$1,421	\$103	\$5,641
Materials	300	280	50	400	...	1,030
Overhead	620	60	180	240	...	1,100
Depreciation	120	10	55	10	...	195
Total Cost	\$4,549	\$502	\$741	\$2,071	\$103	\$7,966

unit cost per carrier for this period \$464 as compared with \$677.

SUMMARY OF REPLIES TO THE MILK HANDLER QUESTIONNAIRE

The conflicting opinions of public health officials on this subject and the interest in control of food handlers induced us to seek the opinions of public health laboratory directors, other health officials, and university professors of public health and bacteriology, in this country and elsewhere, on periodic laboratory examinations of milk handlers in general and on the methods employed in Connecticut in particular. A questionnaire was sent to 205 individuals.

A majority of those who replied believe that routine laboratory examinations of milk handler specimens constitute a desirable adjunct to any program for the control of milk-borne disease. The main differences of opinion were in regard to the types of laboratory examinations desirable.

A number stated they feel routine, periodic examinations have a distinct educational value in demonstrating to milk handlers and producers the source of much milk-borne disease and the manner in which disease germs may be introduced into milk.

Of the 66 individuals expressing an opinion in regard to whether or not the routine laboratory examination of specimens from milk handlers as performed in Connecticut is a sufficiently worthwhile procedure to justify the cost (as previously estimated), 43 felt it a worthwhile procedure, while 23 took the opposite view. The objections were as follows:

1. The procedure gives a false sense of security.
2. The rapidity of turnover in employees makes enforcement difficult.
3. The cost is too great in comparison with results obtained.
4. Pasteurization of the milk supply is a much better and more inexpensive means of attaining the same end.

5. Laboratory examinations should be made only when the physical examination, the employee's past history, or the epidemiological evidence warrants taking specimens of a particular kind.

6. The intermittency of the carrier state lessens the value of any one examination.

A number of those who favored discontinuation objected only to one or more of the tests required in Connecticut, particularly sputum for *Mycobacterium tuberculosis*, the Widal test as an aid in detecting typhoid carriers, and the throat and nose cultures for beta hemolytic streptococci. Only 4 persons out of 65 felt that this routine activity had no value whatsoever regardless of its cost. Fifty out of 55 felt that the use of this procedure must necessarily depend on the locality or the appropriation available and that the examination should be undertaken or not depending upon circumstances.

DISCUSSION OF REPLIES

In discussing the opinions advanced by others we must of necessity examine them in the light of practical experience in Connecticut, and for that reason the conclusions reached may be applicable only to localities where conditions are similar to those under which this procedure has been initiated and developed.

In general, the criticisms of the Connecticut program are from 3 viewpoints—the administrative, the economic, and the scientific.

From the administrative viewpoint some have objected that the use of routine laboratory examinations gives a false sense of security. However, we must not lose sight of the fact that these examinations are not made the sole basis for issuing a health certificate. The certification is made by a licensed physician after physical examination of the milk handler. The laboratory examinations are merely a compulsory, routine part of the physical examination, and the results are reported only

to the examining physician and the local health officer involved. In fact, the examining physician is merely required to certify that the employee is not suffering from any communicable disease at the time of the examination. Milk handlers reported as suffering from communicable diseases between examinations are subject to the requirements of the Sanitary Code ² before returning to their occupation.

From an administrative viewpoint, some have expressed their belief that the turnover among any group of food handlers is too great to permit satisfactory supervision. Our experience is that the turnover among milk handlers in Connecticut is so small that the objection does not have much weight in this state, although doubtless among certain other groups of food handlers, such as restaurant employees, the turnover is normally too great for the application of a similar program.

From the economic viewpoint, some have expressed the opinion that the cost is too great. The cost of the physical examinations is borne by the employers and as yet has not brought about any increase in the cost of milk, so this discussion must be confined to the laboratory tests. Our reported estimates ¹ were stated to be considerably higher than the actual cost, and the more recent cost-survey now reported has shown that the previous estimates were approximately one-third too high. There is no way of determining the value of the results of the program in dollars and cents since we cannot estimate the number of cases of milk-borne disease prevented. However, we wish to reaffirm our position—that examinations of this type can be made in a central laboratory doing a large volume of work at a small average cost per examination (32.5 cents in these laboratories in 1933).

Usually those who maintain that the cost is prohibitive advance the sugges-

tion that pasteurization is the best solution. However, certain practical difficulties make its application impossible at this time throughout most large territories of mixed urban and rural communities. Pasteurization, properly done, is one of the greatest aids to public health officials in reducing disease hazards, but its application has been, and will continue to be, a matter of slow growth furthered almost entirely by educational methods and constantly checked by economic and political forces and misguided prejudices in any community. It is pertinent that a preliminary study of bottled pasteurized milk as delivered to the consumer in Connecticut indicates a decided need for more adequate control from a sanitary standpoint. Using the presumptive test ³ for the *Escherichia-aerobacter* group in the brilliant-green bile medium recommended by McCrady and Archambault,⁴ we have examined 499 samples from 144 pasteurization plants and have obtained positive results in 141 samples from 69 plants. If this may be taken as an indication that more than 28 per cent of samples from 48 per cent of the pasteurization plants included in the study are not thoroughly pasteurized or are contaminated after pasteurization, it would seem necessary to take every possible precaution to prevent occurrences similar to the San Francisco epidemic of 1928 by eliminating the carriers.

The great majority of health officials feel that laboratory examinations should be made if there is any indication that a milk handler may be a carrier of disease when either the physical examination or a history suggestive of past infection suggests the advisability of this procedure. Many feel the laboratory should be used only in this manner. Certain obvious questions must be raised and satisfactory answers provided before the value of the program they suggest can be determined. Under a program

where submission of specimens for laboratory examination is left to the discretion of the examining physician, is it necessary for some responsible central authority to select a group of physicians specifically for the purpose of giving physical examinations to milk handlers in order that the scope and thoroughness of the examination given be rigidly supervised or can the decision be left to the physician employed by the producer, with no more than advisory help from health officials? Can we depend upon the history of past infection gathered from statements made by the person being examined to detect those individuals most likely to be carriers of certain types of organisms? The average milk handler can give only a fragmentary account of past illnesses, and very often his memory does not extend back to childhood, from which time the carrier condition may have existed. Typhoid infection may be so mild that the individual may not have been aware of the nature of his illness. Furthermore, there is a tendency for many individuals to conceal pertinent facts from the examining physician for fear of not being allowed to follow a favored occupation.

It is not within the scope of this paper to discuss this particular type of program from an administrative viewpoint. To the best of our knowledge all but one of the carriers discovered among milk handlers in Connecticut in the past 7 years have been detected purely because laboratory examinations were required, and not as a result of the physical examinations or from a review of each individual's history of past infection.

Some authorities apparently feel the laboratory should be used only to aid in establishing the source of outbreaks. We admit that carriers are more readily and cheaply detected from individuals selected during epidemiological studies, but must point out that this is not a saving in the final analysis. If the car-

rier can possibly be detected before causing an outbreak, no loss occurs. If not, the public must stand the economic loss of the outbreak and, in many instances, new carriers are developed and the vicious cycle repeated in multiple. Our experience suggests that certain laboratory examinations should be made a routine part of the physical examination of a milk handler if we are to attain an acceptable efficiency in detecting carriers and removing them from contact with the milk.

A number of persons have set forth the shortcomings of the Connecticut program from a scientific angle. Chief among these is the fact that the carrier state is often intermittent or transient, and sometimes difficult to detect when required specimens are spaced at long intervals. This is a valuable criticism of the efficiency of the program, but in no way invalidates the results which can be and have been obtained under the circumstances. Answers to the questionnaire have also raised numerous questions in regard to the scientific value of certain of the tests required. These can best be discussed by treating each one separately.

Sputum for Tuberculosis—Forty-two of the replies to the questionnaire were in favor of continuing the examination of sputum for *Mycobacterium tuberculosis*; 19 were in favor of discontinuing it. The principal objections to this examination were: (1) A satisfactory physical examination should locate cases of tuberculosis before a positive sputum can be obtained. (2) Epidemiological evidence does not indicate that tuberculosis is at all frequently disseminated through handling of any food material by a tuberculous patient. On the other hand, some felt this is a valuable procedure since it provides a means of detecting open cases of tuberculosis in a representative group of individuals on a state-wide basis. It is well to consider here that the detection of an open

case of tuberculosis in a milk handler is perhaps more important from the standpoint of his contact with other dairy workers, and especially with his own family, than from that of his spreading the infection through contamination of the milk. As shown in our previous study, the practical results from the application of this routine procedure have been the detection of 7 open cases of tuberculosis among milk handlers in 6½ years. In all these instances, investigation has brought forth the opinion that the lesions were small ones, not readily detectable by physical examination, and that in all probability the number of organisms being thrown off in the sputum was minimal.

Throat Cultures for Virulent Diphtheria Organisms—Forty-eight individuals out of 64 answering this portion of the questionnaire were in favor of continuation of cultures from the throat for virulent diphtheria organisms. Those who favored discontinuing this examination pointed out the following facts: (1) Carriers of diphtheria organisms are quite frequently of the intermittent type and in many instances the carrier condition is very transient so that examinations have to be made too frequently to be practicable if all carriers are to be detected. (2) Milk-borne outbreaks of diphtheria are relatively rare, and their occurrence is becoming even more rare. (3) Immunization of the susceptibles in any given population can be obtained at a relatively small cost. However, persistent carriers of diphtheria organisms have been encountered in the work of nearly every experienced laboratory worker and these should be given particular attention in framing a milk handler control program.

Nose Cultures for Virulent Diphtheria Organisms—Forty-three out of 62 were in favor of continuing the making of nose cultures for diphtheria organisms. These cultures were discussed along the

same lines as throat cultures but some felt that the making of nose cultures as well as throat cultures was an unnecessary duplication of effort. Bartlett and Bransfield,⁵ however, have shown that nose cultures are as important as throat cultures if all carriers are to be detected.

Feces for Typhoid and Paratyphoid Organisms—Sixty-one were in favor of continuing the examination of feces specimens for typhoid and paratyphoid organisms; 5 were in favor of discontinuing this examination. Those in favor of discontinuing pointed out the intermittency of the carrier state or said that they felt these examinations should be made only when history of past infection indicates a possible carrier.

Urine Specimens for Typhoid and Paratyphoid Organisms—Fifty favored continuation of the examination of urine specimens for typhoid and paratyphoid organisms; 15 were in favor of discontinuing this examination. It was pointed out that the objections to feces examinations apply equally to urine examinations, and in addition a number of individuals felt the examination of urine for typhoid organisms was unnecessary because urinary carriers are so infrequent and so seldom cause outbreaks.

Widal Tests for Typhoid and Paratyphoid Agglutinins—Thirty-two favored continuation of Widal tests for typhoid and paratyphoid agglutinins; 29 favored discontinuation of this test as irrelevant. Many held the opinion, borne out by our previous study, that the Widal test is of little aid in selecting possible carriers. The widespread use of typhoid bacterins in recent years has tended to minimize the importance of a positive Widal in the individual who is not ill. Many observers, including Gay,⁶ Rosenau,⁷ and Park, Williams, and Krumwiede,⁸ have stated that a positive Widal is found in from 50 to 75 per cent of carriers. None of the

carriers found in our previous study gave a positive Widal, and numerous individuals, with and without history of antityphoid inoculation, were positive and failed to give positive cultures even after repeated stool examinations. Since our previous study the Widal test has been discontinued as a compulsory requirement. However, studies on the type of agglutinins present (H and O) in an individual's serum are of much greater import than the ordinary Widal reaction as usually applied. Wyllie^{9, 10} has recently made pertinent observations on the relative occurrence of both the large-flaking, flagellar (H) and the small-flaking, somatic (O) agglutinins in a series of cases including normal individuals, carriers, inoculated individuals, and enteric fever patients. In general he points out the importance of the small-flaking reaction as presumptive evidence of the carrier condition as compared with the large-flaking reaction in normal inoculated individuals; also that the small-flaking agglutinins may be present shortly after prophylactic inoculation, but the titer falls to very low limits within a short time although that of large-flaking agglutinins may persist for longer periods.

Examinations for Endameba Histolytica—A few individuals expressed their opinion that examinations of stool specimens should be made for vegetative forms and cysts of *Endameba histolytica*. Cases of infection by this parasite are characterized by the fact that they occur sporadically or epidemically and never assume epidemic status¹¹ unless the recent outbreak emanating from Chicago can be considered in this light. Therefore, aside from the difficulty of obtaining specimens under practical conditions, such routine examinations would find little justification from an administrative viewpoint.

Examinations for Dysentery and Food Poisoning Organisms—Thirty-six

believed special effort should be made to detect dysentery and food poisoning organisms when examining specimens of feces and urine from milk handlers; 32 were of the opposite opinion. Our experience has been that it takes very little additional effort to examine specimens for significant members of the *Shigella* and *Salmonella* groups when culturing for typhoid and paratyphoid organisms.

Throat Cultures for Beta Hemolytic Streptococci—The examination of cultures for beta hemolytic streptococci in the throats of milk handlers has provoked the most discussion in regard to its significance. Twenty-eight individuals favored continuation of this test; 31 favored discontinuation. Many pointed out that streptococcus infections are often so transient that laboratory examinations may miss some infected handlers. Increasing the frequency of examination up to a reasonable maximum and making the employer responsible for reporting promptly to the examining physician any unusual throat condition in any handler will to some extent overcome this difficulty.

Nose Cultures for Beta Hemolytic Streptococci—Twenty-four favored continuation of making cultures for beta hemolytic streptococci on specimens of nose swabbings; 31 favored discontinuation of this examination. Some felt the making of a nose culture in addition to a throat culture on each individual was an unnecessary duplication of effort.

SIGNIFICANCE OF BETA HEMOLYTIC STREPTOCOCCI IN ROUTINE CULTURES FROM MILK HANDLERS

Discussion of the Methods Used—Swabbings from the throat and nose are received usually 18 hours after taking the specimens (maximum 24 hours). These are smeared over the surface of sheep blood agar in a Petri plate. The plates are incubated overnight (16 to 24 hours) and then examined for

colonies or areas showing typical beta hemolysis. When such colonies or areas are observed, slides are made and examined for the presence of streptococci. Ordinarily, no long chains are observed but a trained observer can easily and consistently eliminate those colonies showing hemolysis due to staphylococci and certain rod-shaped organisms. Colonies showing greening or methemoglobin production are not readily confused with beta hemolytic streptococci, although the alpha prime types of Brown¹² are occasionally difficult to classify. All colonies showing hazy or incomplete hemolysis are considered negative.

The method is designed for practical use in a laboratory doing a large variety of work with a limited personnel. Under these circumstances it has seemed the most expedient method available for complying with the requirements of the Milk Regulation Board that the examining physician determine by laboratory tests "that a milk handler does not harbor the germs of streptococcus sore throat." The method is by no means exact, and may be considered analogous to the presumptive test for the presence of coli-aerogenes organisms in water. It has been suggested that the method would be of greater value if enrichment cultures were made before plating. Beta hemolytic streptococci in the throat or nose of a milk handler are probably a menace to the health of consumers only when present in readily detectable numbers, so we consider enrichment methods an unnecessary refinement for this practical application.

Many persons have suggested that the use of pour plates or a combination of pour and streak plates would give much greater satisfaction than the method now in use. Others have suggested that incubation of plates under anaerobic conditions would be more satisfactory. The answer to these two questions probably awaits elucidation of

the oxidation-reduction capacities of the cultures during growth. Hagan¹³ has shown that viridans cultures under anaerobic conditions may be confused with beta types due, presumably, to scanty production of peroxide. Some stated they thought the time elapsing between the taking of specimens and streaking on plates was too long to permit satisfactory results, but the well known resistance of streptococci to drying (Kurth,¹⁴ Pasquale¹⁵) should make these forms more likely to survive than many other throat organisms. Several prominent authorities on streptococci have stated in personal communications that they did not feel this elapsed time was of practical significance in their experience.

Significance of Findings—The percentage of normal throats showing hemolytic streptococci of the beta type has been stated to be quite high by various workers.^{16, 17, 18, 19} Our experience with milk handlers has been that we have found approximately 1 per cent of all cultures examined positive. At first glance these two facts seem to be irreconcilable, but it must be considered that most of the work to determine the frequency of occurrence of hemolytic streptococci in normal throats has been very exhaustive and has included a study of tonsillar crypts, whereas our results have been obtained from surface swabbings. It is now generally understood that beta hemolytic streptococci are present in the tonsillar crypts of the great majority of people living in closely populated areas. It has also been shown by many investigators that beta hemolytic streptococci occur less frequently in persons from whom tonsils and adenoids have been removed. Williams²⁰ states:

In regard to the question of danger from healthy carriers of streptococci we must conclude that, since these organisms are so universally present, and since we know so little about their natural mode of increase in virulence, they must all be considered as po-

tential pathogens and, consequently, we all must be considered as potential carriers of dangerous streptococci.

Considering all these facts, it is logical to assume that cultures of swabbings from the surface of the throat tend to detect only those individuals who are harboring large numbers of beta hemolytic streptococci. In the absence of a better criterion, it has been the policy of this department to consider these individuals as potential spreaders of milk-borne disease and to insist that they be kept from handling milk until 2 successive negative cultures have been obtained at least 24 hours apart. The invasion of the surface membranes of the throat or nose from tonsillar crypts by these organisms may possibly be the first indication of the "increase in virulence" referred to by Williams.

The net result of our procedure is, then, to give the consuming public the benefit of the doubt from an epidemiological viewpoint by excluding from the handling of milk persons harboring large numbers of beta hemolytic streptococci. It has seemed advisable to regard these handlers as possible foci of milk-borne streptococcus infections since no satisfactory test is available for determining the virulence of streptococci.

Opinions of Examining Physicians—In addition to the questionnaire, opinions in regard to this particular examination were obtained from the physicians engaged to examine employees who handle milk. Only 3 stated definitely that they did not favor the present policy, that of removing a milk handler from handling milk upon finding beta hemolytic streptococci in the throat or nose until 2 negative cultures, 24 hours apart, had been obtained; while 105 favored the present policy, although approximately one-third of these favored it only as applied to handlers of raw milk. In their experience positive results have been obtained in the absence of clinical symptoms and negative re-

sults in the presence of throat symptoms which may or may not have been caused by beta hemolytic streptococci. The great majority stated these occurrences were only occasional in their experience, and some added that positive findings were often associated with signs of throat irritation or unusual redness of the handler's throat. More than one-half the physicians answered that these examinations had been of definite value to them. Another point mentioned by a few was that educational measures alone fall far short of their goal in gaining the coöperation of employees. A number felt more should be done to determine the virulence of the organisms found.

Measures Available for Determining the Virulence of the Organisms Found—

The criteria upon which we must ultimately base an interpretation of our positive findings must take into consideration the invasive power of the organisms isolated rather than their ability to produce a soluble exotoxin similar to or identical with scarlatinal toxin. Some idea as to the possible significance of a given strain may be obtained from morphological and biochemical studies, especially along the lines of the recent work of Edwards.²¹ Pathogenicity experiments on animals are of relatively little value in determining the invasive power of the organisms for humans. A correlation between the virulence of strains isolated from healthy carriers and their type specific substances as determined by Lancefield's²² technic might possibly be of value. Recently Tillett and Garner²³ have found that strains of beta hemolytic streptococci isolated from scarlet fever, septicemia, erysipelas, tonsillitis, acute nephritis, and otitis media secrete a soluble enzyme or toxin which has the power to lyse human fibrin, but not rabbit fibrin. Strains of the streptococci of non-human origin were completely non-fibrinolytic with few exceptions. If

this reaction is found to be at all specific there is some possibility of its being used as an index of the invasive power of any given strain of streptococcus for human beings. Some correlation has been shown between the virulence of beta hemolytic streptococci and ability to grow in defibrinated human blood by Todd.^{24 25, 26} McLeod²⁷ has, in addition to this, studied hemolysin production in fresh human serum as related to virulence and has briefly reviewed²⁸ the literature correlating other characteristics of these organisms with virulence.

In the light of practical experience we cannot concur in the view that the characteristics ascribed to "*Streptococcus epidemicus*" or "*Streptococcus scarlatinae*" are sufficiently broad to include the only streptococci capable of causing milk-borne septic sore throat or scarlet fever. It is pertinent to quote Andrewes²⁹:

It would seem that we have here a genus eminently successful in the struggle for existence, actively varying and constituting a group of "species in the making" which it is best consciously to approach as such. . . . The most abundant may be regarded as "centers of variation" around which the intermediate forms are grouped, and these centers may be treated as nascent species to which we may conveniently give names.

THE RÔLE OF THE LABORATORY IN A RATIONAL MILK HANDLER PROGRAM

We have discussed various viewpoints of the applicability of routine laboratory examinations of milk handler specimens to the general problem of preventing milk-borne disease. Although our own viewpoint has been greatly influenced by our experience in Connecticut we have attempted to evaluate impartially the opinions gathered from a questionnaire. In this evaluation certain fundamental principles have stood out from others and deserve incorporation in a program designed to include minimum requirements for this work.

A program designed to attain an acceptable efficiency in preventing contamination of milk supplies by milk handlers who are carriers of organisms capable of causing disease in the consuming group, must first of all include handlers of all milk supplies over which administrative supervision can be exercised with a thoroughness compatible with success. Control of the very small dairy supplying one or a very few families is extremely difficult, if not impossible. In regard to pasteurized supplies, assuming that every portion of the milk is actually pasteurized according to a satisfactory definition, with adequate inspectional and plant control facilities, it is necessary to subject to the program only those handlers who may contaminate the pasteurized product, directly or indirectly, in the processes of cooling, bottling, capping, or distributing the milk. In Connecticut nearly every employee in a pasteurizing plant is called upon to do work of this type at some time.

This program must then take into consideration the epidemiological significance of milk in the prevalence of the diseases from which the consuming public should be protected, and the means by which the incidence of milk-borne disease can be most effectively reduced with the funds available. Not only a laboratory program, but also administrative, educational, medical, and sanitation programs must be carefully considered to determine the proper place of each in the general scheme. The importance of milk as a foodstuff, its prominent place in the diet of all age groups, its peculiar physical and chemical properties which render it readily susceptible to contamination and capable of sustaining dangerous bacterial life, and the fact that all methods of production involve a certain risk of contamination from human sources, necessitate the utmost in careful planning from health officials to mini-

mize the hazard. The point is not that so much has been accomplished but that more can be accomplished to benefit the public health. The primary aim should be to attain more than merely acceptable efficiency in this field.

The relative importance of the various types of milk-borne diseases traceable directly or indirectly to carriers or cases among milk handlers can be judged from the number of consumers affected by each type since 1910. Infections with beta hemolytic streptococci occupy the front rank. Furthermore, the death rate per outbreak has been higher for these infections than for the others under consideration. The weight of these epidemiological facts is sufficient to make remedial measures mandatory in regions where these infections are common. Brooks³⁰ has advanced the opinion that many outbreaks of this type are "missed." Typhoid fever and related infections comprise the next most important group in which the human carrier has been implicated. Milk-borne diphtheria is comparatively rare and the use of toxin-antitoxin or toxoid will immunize the great majority of the susceptibles in any community and confine the occurrence of diphtheria from all sources to a few sporadic cases. Milk-borne tuberculosis is almost exclusively confined to the bovine type which is outside our discussion.

With these facts in mind, it seems rational to stress the importance of research to develop reliable methods of correlating the characteristics of the beta hemolytic streptococci isolated from throat and nose cultures with those of known pathogenic strains. Coincident with the development of satisfactory methods for this, it would then appear feasible to remove milk handlers from contact with milk when they harbor proportionately large numbers of organisms identical with pathogenic strains, and to keep them isolated until the carrier condition was cleared

up as determined by appropriate release cultures. This is particularly important on a raw milk supply if the handler is a milker, since he may infect the cows' udders and thus grossly contaminate the supply.

A well rounded program should include laboratory examinations to detect carriers of the typhoid-paratyphoid-dysentery group of organisms. Perhaps these may best be concentrated over a short time before or during the period when the handler first begins employment. An adequately large series of feces specimens should be examined to permit detection of the intermittent carrier. At least 2 urine specimens should also be included to detect urinary carriers. Primary attention should be paid to the organisms of typhoid and paratyphoid fevers, but the procedure can be adapted readily and with little additional effort to detect other significant organisms of the enteric group which are recognized causes of dysentery and food poisoning. Care should be exercised to insure the authenticity of these specimens. We have found little value in the Widal test as an aid in this connection and do not recommend its use. Even when specific attention is paid to the type of agglutination known as granular, small-flaking or somatic, negative results cannot be depended upon to exempt those who are not carriers from having stool specimens examined.

The detection of diphtheria carriers is probably of major importance only in areas where the disease is prevalent. In those areas a small number each of throat and nose cultures, taken at least 24 hours apart, for virulent diphtheria organisms may be included at the time the examinations of feces and urine specimens are made. These are recommended for the primary purpose of detecting those who are persistent carriers of these organisms. All positive findings should be confirmed by the use of a satisfactory virulence test.

The examination of sputum for *Mycobacterium tuberculosis* is relatively unimportant from the standpoint of milk-borne disease and may well be left to the discretion of the examining physician.

We see no sound reason for incorporating examinations for vegetative or encysted forms of *Endameba histolytica* in the program, in the light of our present knowledge, unless there is definite reason to believe milk an important factor in disseminating amebic infection in any given locality.

Local sanitary codes, rules or regulations should be amended to apply to handlers who are kept from handling milk under this program, and compatible release requirements incorporated.

Finally, a satisfactory physical examination made periodically by a licensed physician should be compulsory for all milk handlers subject to the requirements of the program. All specimens for laboratory examinations should be collected by him or under his supervision and all laboratory reports made only to him and to the proper administrative authorities. Both employers and employees should be made responsible for reporting to him, following his instructions, any suspicious clinical symptoms among the milk handlers. The examining physician should be required to inquire into each handler's history of past infection at the first examination, and the submission of specimens for laboratory examination over and above the minimum required should be left to his discretion.

SUMMARY AND CONCLUSIONS

1. Based upon statistics for the entire United States from 1880 to 1933 and for Connecticut from 1918 to 1933, the epidemiological importance of milk-borne diseases traced to human carriers and cases is discussed. Streptococcus infections have been responsible for almost 4 times as many cases as have the enteric infections, although the number of cases of the latter is of real sig-

nificance. Diphtheria has been relatively unimportant as a milk-borne disease from a national viewpoint, and no cases have been traced to milk in Connecticut during the period for which statistics are available. The large percentage of insusceptibles in the general population of many sections of the country tends to make the occurrence of milk-borne diphtheria sporadic in nature although there is still danger particularly for unimmunized children. The statistics indicate the necessity for remedial measures to control milk-borne infections.

2. Periodic physical examinations of milk handlers supplemented by certain routine laboratory tests are desirable for raw milk handlers and employees in pasteurization plants.

3. A revised estimate of the cost of the laboratory program in Connecticut is based on actual costs in 1933. The total cost for 24,487 laboratory examinations was \$7,966, making the average cost per examination about 32½ cents.

4. Authoritative opinions on routine laboratory examinations of milk handler specimens and pertinent comments on the Connecticut program are recorded and discussed in the light of experience in Connecticut.

5. The laboratory examinations discussed are: Throat and nose cultures for virulent diphtheria organisms and for beta hemolytic streptococci; sputum for *Mycobacterium tuberculosis*; feces and urine for typhoid, paratyphoid, dysentery, and food poisoning bacteria; Widal tests; feces for vegetative or encysted forms of *Endameba histolytica*.

6. Because of the relative importance of streptococcus infections, particular stress is laid upon a discussion of the significance of beta hemolytic streptococci in cultures from surface swabbings of throat and nose membranes of milk handlers. This culturing procedure tends to detect those individuals harboring large numbers of these organisms. In the absence of a reliable criterion for the virulence of these organisms, the consuming public is given the benefit of the doubt when the handling of milk by individuals found positive for typical beta hemolytic streptococci is prevented.

7. The rôle of the laboratory in a well rounded milk handler control program is discussed and the following program is suggested as reasonably complete when supplemented by educational measures:

a. A series of feces examinations for organisms of the enteric disease group should be made before or at the beginning of employment. This series should be large enough

so that chances of missing the intermittent carriers are slight.

b. A minimal number of urine examinations for the same purpose should be made to detect the relatively infrequent urinary carriers.

c. In areas where diphtheria is prevalent a minimum number each of throat and nose cultures for virulent diphtheria organisms, taken at least 24 hours apart, should be examined before or at the beginning of employment to detect persistent carriers of these organisms.

d. Examinations of throat and nose cultures for beta hemolytic streptococci should be incorporated as soon as reliable and practicable methods for determining the virulence or invasive power of any given strain are developed. In the absence of a satisfactory criterion it may be desirable in some areas to regard any milk handler as dangerous when he is harboring large numbers of typical beta hemolytic streptococci.

e. Satisfactory release requirements, compatible with local sanitary codes, rules or regulations must be provided for those milk handlers who are found harboring the organisms of, or suffering from, infectious diseases.

f. A thorough physical examination by a licensed physician should be given each milk handler before beginning employment and should be required of all milk handlers if maximum protection is to be afforded the consumer.

g. A careful inquiry into the history of past infection should be made at each individual's first examination.

h. All employees and employers should be made responsible for promptly reporting suspicious clinical symptoms of any sort in any milk handler to the examining physician, and the examining physician to the proper administrative authorities.

i. All required laboratory specimens should be taken by or under the supervision of the examining physician to assure authenticity of specimens, and additional specimens should be collected at his discretion from his findings.

j. All laboratory reports should be made only to the examining physician and the proper administrative authorities.

REFERENCES

1. West, D. E., Borman, E. K., and Mickle, F. L. The Detection of Carriers among Food Handlers in Connecticut. *A.J.P.H.*, 24:493 (May), 1934.
2. Connecticut State Dept. of Health. The Sanitary Code of the State of Connecticut: *Regulation 15*, 1931.
3. *Standard Methods of Milk Analysis*, 6th ed. American Public Health Association, New York, 1934.
4. McCrady, M. H., and Archambault, J. Examining Dairy Products for Members of the *Escherichia-acrobaeter* Group. *A.J.P.H.*, 24:122 (Feb.), 1934.
5. Barilett, C. J., and Bransfield, P. E. Value of Multiple Cultures in the Diagnosis of Diphtheria. *A.J.P.H.*, 14:327 (Apr.), 1924.
6. Gay, F. P. *Typhoid Fever*. Macmillan Company, New York, 1918.
7. Rosenau, M. J. *Preventive Medicine and Hygiene*. D. Appleton and Co., New York, 1927.
8. Park, W. H., Williams, A. W., and Krumwiede, C. *Pathogenic Microorganisms*. Lea and Febiger, Philadelphia, 1929.
9. Wyllie, J. Experiences with Small-Flaking or Granular Agglutination in Normal, Inoculated and Enteric Fever Cases. *J. Hyg.*, 22:375, 1932.
10. Wyllie, J. The Serological Diagnosis of Typhoid Carriers. *Am. J. Hyg.*, 18:393, 1933.
11. Park, W. H. *Public Health and Hygiene*. Lea and Febiger, Philadelphia, 1928.
12. Brown, J. H. *The Use of Blood Agar for the Study of Streptococci*. Monographs of the Rockefeller Institute for Medical Research, 9:1919.
13. Hagan, W. A. The Green Coloration by Certain Streptococci on Blood Agar. *J. Infect. Dis.*, 37:1, 1925.
14. Kurth, N. Ueber die Unterscheidung der Streptokokken und ueber das Vorkommen derselben, in besondere des *Streptococcus conglomeratus*, bei Scharlach. *Arb. u.d.k. Gsndtsamte* 7:389, 1891.
15. Pasquale, A. Vergleichende Untersuchungen ueber Streptokokken. *Beitr. z. Path. Anat. u. z. allg. Pathol.*, 12:433, 1893.
16. Davis, D. J. Bacteriology and Pathology of Tonsils. *J. Infect. Dis.*, 10:148, 1912.
17. Pilot, I., and Davis, D. J. Hemolytic Streptococci in the Tonsillar Tonsil and Their Significance as Secondary Invaders. *J. Infect. Dis.*, 24:386, 1919.
18. Tongs, M. S. Hemolytic Streptococci in the Nose and Throat. *I.A.M.A.*, 73:1050, 1919.
19. Pilot, I., and Perlman, S. J. Bacteriologic Studies of the Upper Respiratory Passages. *J. Infect. Dis.*, 29:47, 1921.
20. Williams, A. W. *Streptococci in Health and Disease*. Williams and Wilkins, Baltimore, Md., 1932.
21. Edwards, P. R. The Biochemical Characters of Human and Animal Strains of Hemolytic Streptococci. *J. Bact.*, 23:259, 1932.
22. Lancefield, R. C. A Serological Differentiation of Human and Other Groups of Hemolytic Streptococci. *J. Exper. Med.*, 57:571, 1933.
23. Tillett, W. S., and Garner, R. L. The Fibrinolytic Activity of Hemolytic Streptococci. *J. Exper. Med.*, 58:485, 1933.
24. Todd, E. W. Method of Measuring Increase or Decrease of Population of Hemolytic Streptococci in Blood. *Brit. J. Exper. Path.*, 8:1, 1927.
25. Todd, E. W. Virulence of Hemolytic Streptococci. *Brit. J. Exper. Path.*, 8:289, 1927.
26. Todd, E. W. Influence of Sera Obtained from Cases of Streptococcal Septicemia on Virulence of Homologous Cocci. *Brit. J. Exper. Path.*, 8:361, 1927.
27. McLeod, J. W. Discussion on the Streptococci. *Brit. M. J.*, 2:791, 1921.
28. McLeod, J. W. Streptococci Readily Secreting a Filterable Haemolysin. *A System of Bacteriology*, 2. His Majesty's Stationery Office, London, 1929.
29. Andrewes, F. W. The Nomenclature and Classification of Micro-organisms. *A System of Bacteriology*, 1. His Majesty's Stationery Office, London, 1930.
30. Brooks, P. B. "Missed" Epidemics of Septic Sore Throat. *A.J.P.H.*, 23:1165 (Nov.), 1933.

Recent Studies on Psittacosis*

K. F. MEYER, PH.D., B. EDDIE, AND I. M. STEVENS, F.A.P.H.A.

*George Williams Hooper Foundation, University of California, and
California State Department of Public Health,
San Francisco, Calif.*

PSITTACOSIS as a problem attracted the attention of the public health authorities during the pandemic of 1929-1930.¹ Single or group infections followed the exposure to parrots. At first, it appeared that the shipments of these birds from Argentina, South and Central America, with their ensuing distribution in pet shops and the contact infections in these places, would explain the pandemic. It is now evident that South America was not the only source of infection. Although the influence of the Argentine epidemic, with its subsequent rapid disposal of infected birds from the stores in South America, on the total number of human cases is great, it is quite obvious that other unknown factors must have operated, and other primary foci must have existed.

Under the influence of the universal and effective publicity which was given in the lay and scientific press, undoubtedly sporadic cases, which would ordinarily have escaped recognition, were brought to light. The data of the past 2 years amply support this statement. Following a case of psittacosis in a prominent person, attention is called to this supposedly rare disease. Several cases and even epidemics have thus, in

rapid succession, been discovered by health departments.

Even under California conditions where the interest has been kept alive among physicians and health officers, the report of one case is usually followed by the recognition of others. It is, therefore, the belief of those who have dealt with this malady that, during inter-epidemic periods, many cases have escaped detection and notification.

That birds other than South American parrots were involved in the epidemic of 1929-1930 in the United States is now fully realized. In December, 1929, Dr. Dannenbaum diagnosed a case of psittacosis (clinical and X-ray findings typical) in a patient who had received several shell parakeets from a San Francisco pet shop. In January, 1930, Sandoer and Coburis² saw a mild and a severe psittacosis infection in a mother and daughter who had handled "love birds" (shell parakeets) originally shipped from Los Angeles. Dr. Chisholm at Vancouver and Dr. Ridewood at Victoria, B. C., made similar observations in March, 1930 (McIntosh³).

Late in December, 1931, the Division of Epidemiology of the California State Department of Public Health was notified of the death of 3 people and the illness of a fourth, all of whom had been together shortly before their illness at a home in Grass Valley. The clinical

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934, as an introduction to the demonstration of a teaching film: "A Disease of Parakeets Transmissible to Man" (16 mm., 1050 feet).

history of a typhoid-pneumonia-like disease, in form of a house epidemic, suggested the diagnosis of parrot fever. Inquiries established the fact that a healthy shell parakeet was in the home but that the mate had died on or about December 1, and that the husband, who was seriously ill, had buried it. A clinical examination of the patient in the light of these facts left no doubt that the symptoms were those of severe psittacosis. Subsequently, the presence of the virus in the sputum, and at autopsy in the lung, liver, and spleen conclusively proved the correctness of the diagnosis. Furthermore, the parakeet, which had been found in the house and held under observation for 43 days after the death of its mate, revealed on autopsy an enlarged spleen from which the psittacosis virus was readily obtained by mouse passage.

Incident to the publicity which was given to the dramatic deaths through contact with shell parakeets, reports of clinically typical cases of parrot fever, observed by physicians during the past few months, gradually filtered in from the southern part of the state. The victims had been exposed to parakeets of their own breeding or to birds which had been raised in the aviaries of Southern California.

Investigations conducted by the health authorities during the month of January, 1932, disclosed a vast bird breeding industry in parakeets and other birds, concerning which very little had been known. Laboratory examinations of sample birds obtained from some of these aviaries showed that a fairly large percentage of the shell parakeets carried the psittacosis virus in their spleens and livers. There was no doubt that psittacosis, as an infectious disease of the shell parakeets, existed in the California aviaries. Drastic measures of control could not be instituted since thousands of people, directly or indirectly, derived their liv-

ing from the breeding and raising of these birds. Aside from the public health aspect, the control of psittacosis assumed the importance of an industrial problem. It is this phase of the subject which had to be considered continuously in the investigations which were undertaken.

These data, together with previous and subsequent reports, rather forcibly call attention to the importance of the shell parakeet as a source and spreader of the psittacosis virus. One recalls the epidemic observed by Friedrich (1892) at Dühringsdorf near Landsberg, the house epidemic at Krefeld (1899),⁴ and at Zülrich (1909),⁵ the peculiar malady on the campus of the Veterinary College at the University of Zürich in January, 1930,⁶ and the isolated cases at Geneva (1929),⁷ Graz (1929),⁸ at Vancouver (1930),³ in England (1930),⁹ and in New York (parakeets of Cuban,¹⁰ Japanese and Dutch origin). More recently Fortner and Pfaffenberg¹¹ discussed their investigations undertaken in connection with 29 psittacosis family epidemics of 62 cases (54 in Berlin) and a mortality of 12 or 19.5 per cent. Equally significant are the reports from Saxony from 1931 to 1934.¹¹ Sixty-six cases of psittacosis with 15, or 22.7 per cent, deaths were caused by locally bred and raised parakeets.

It is apparent that the breeding establishments of many countries, dealing principally with the much desired shell parakeets (*Melopsittacus undulatus*), are infected with psittacosis and are a definite menace to the owners, the dealers of pets, and the patrons of these distributing agencies. Until it was recognized that domestic birds carry psittacosis the control of the disease, by preventing the traffic in tropical birds, appeared relatively simple. In view of the newer knowledge, the procedures have to be changed and the evil must be attacked at its root. The California studies furnish data which may serve as

guides in the formulation of adequate protective measures.

THE CAUSE OF PSITTACOSIS

The investigations conducted during the pandemic of 1929-1930 established as the etiologic agent of psittacosis a corpuscular virus, in part, filterable. In particular, the discovery of the minute, Gram-negative ovoid or spherical bodies in virulent human and bird tissues by Levinthal, Cole, and Lillie,¹² and the recognition of the white mouse as a very susceptible test animal for the virus by Krumwiede, McGrath, and Oldenbusch¹³ have greatly facilitated the practical diagnosis of psittacosis. The intraperitoneal injection of mice with the suspected material constitutes the best and safest procedure to demonstrate the presence of the virus.

No examination can be considered complete without a careful search for the elementary bodies described first by Levinthal, which possess in the diagnosis of psittacosis the same value as the Negri bodies in rabies. The particle size of the elementary bodies and their intracellular location (Bedson¹² and personal observations) render filtration of the virulent specimens an irregular procedure. Consequently, infectious sputa or other secretions or excreta cannot be safely freed from their bacterial contaminations by passage through infusorial or asbestos filters without the risk of losing the virus in part or in toto. Fractional centrifugalization of broth suspensions and repeated subcutaneous injections must be employed in the search for the psittacosis virus in contaminated specimens. The virus resists the action of glycerine (pH 7.4) for at least 66 days when held at 5° C. Desiccated bird spleens remain virulent at 5° C. for 277 days. Virulent contents of the cloaca rapidly lose their infectiousness on desiccation at room temperature.

The *Salmonella psittacosis* has been isolated in one instance only in the parrakeets of one local breeding establishment. In a shipment of 132 South American paroquets and parrotlets, 12 per cent of the birds harbored *S. psittacosis*, an organism closely related to "*S. aertrycke*" in the intestines, liver and spleen.¹⁴ Certain strains of the psittacosis virus increase in virulence for mice by passage and may infect in a dilution of 10⁻¹². Sputum strains and those from "epidemic" birds are more rapidly "passed" than the Australian parrakeet and the South American carrier strains.

SUSCEPTIBILITY OF BIRDS AND MAMMALS

A phylogenetic study of the natural hosts of psittacosis is still in progress. From a practical standpoint it is important to recognize that a great many species of birds, various rodents, monkeys, etc., may be infected by injection or by feeding. By exposure to infected parrakeets, the susceptibility of the fowl (*Gallus gallus* belonging to the order *Galliformes*), parrotlet, conure and cockateel (order *Psittaciformes*), Java sparrow (order *Passeriformes*, family *Ploceidae*), canary, nonpareil, Bengalese (family *Fringillidae*), and Pekin robin (family *Timaliidae*) has been definitely established by placing them in the breeding pens of the budgerigars. Particularly susceptible are the Java sparrows. These birds may serve as excellent sentinels for the detection of the presence and the dissemination of the virus in a room or pen in which parrakeets with latent psittacosis are held. Young chickens intimately exposed may succumb to psittacosis. The virus grows freely in the chick embryo when placed on the chorion-allantoic membrane of the developing egg.

EPIDEMIOLOGY OF HUMAN PSITTACOSIS

Since December, 1929, 189 cases of psittacosis and 14 suspects with 40

deaths, or 21.28 per cent mortality, have been reported in the United States and Canada. One hundred and seventy cases (14 suspects) had direct or indirect contact with diseased shell parakeets. In California, 70 cases resulted from exposure to locally raised birds, while in other parts of the Union or in Canada shipments of the California birds were responsible for 98 additional cases. During the same period 17 infections due to contact with parakeets from Cuba, "the Orient," Yokohama, and Holland have been recorded. The origin of the parakeets in 2 cases (Wisconsin and Minnesota) remained undetermined. Two patients contracted their infections in California through exposure to canaries.¹⁵ The virus was demonstrated in the spleen of 3 of 12 canaries. In the California series, at least 3 and in all probability 6 cases were human to human transmissions.

In the Pittsburgh outbreak, a non-fatal case transmitted a fatal infection to the nursing sister. For the first time, the transmission chain was conclusively proved in 2 instances. The psittacosis virus was demonstrated in the sputum of the patient and in the blood and sputa, respectively, of the 2 nurses who became infected. In another instance, the lung of the fatal case was virulent and the sputum of the nurse contained the same infective agent. The clinical manifestations repeated themselves with their usual variability in intensity; in this respect they differed in no way from the classical descriptions available.

The incubation time, although in many instances difficult to establish, is definitely known in 15 cases and varied from 7 to 14 days after initial contact. In 3 cases a single exposure occurred and the incubation time was 7, 8, and 9 days, respectively. In human to human transmission the interval between the onset of the illness and the discharge of the nurse from the case was 8 and 13 days. Important is the observation

that 30 days elapsed between the death of a woman and the first symptoms of psittacosis in her nurse. This must be considered an exceptionally long incubation period since it is reasonable to suspect that the transfer of the virus occurred a few days before the death.

No explanation can be offered for the noteworthy fact that the same degree of contact and the same virus may induce diseases of varying degrees of severity. It is not unlikely that the susceptibility of man is quite variable and that a fair percentage may pass readily through the disease which remains in a latent or sub-clinical stage. In isolated cases, exposure to sick or dead shell parakeets may induce clinical manifestations which, in any one patient or in any stage of the malady, are insufficiently characteristic to enable the physician to make a diagnosis. The recommendation, therefore, may be safely made that, until the sale of non-infected birds can be guaranteed, it is well to be biased and to suspect psittacosis whenever a patient has recently brought birds liable to this disease into his or her household and suffers from severe influenza, complicated by a "migrating" pneumonia. However, it is imperative that this suspicion or a clinical diagnosis be confirmed even though present laboratory methods frequently decide merely in retrospect. A definite laboratory diagnosis is desirable for epidemiologic reasons.

An examination of the blood for virus has little diagnostic value. In 28 clinical cases examined, the citrated blood of 3 patients infected mice when the blood was collected on the 1st, 2nd, and 4th day, but not on the 9th, 16th, or 17th day of the illness. On the other hand, the examination of sputa, first introduced by Rivers and Berry,¹⁶ has proved quite valuable. In a series of 60 sputa, the virus was conclusively demonstrated in 14 patients whose expectorations were collected on

the 5th, 6th, 7th, 9th, 10th, 12th, 14th, 16th, 23rd, and 37th day, respectively, after the onset. One patient furnished a positive sputum on the 5th and on the 10th day but a negative one on the 16th day, while in a fatal case, the secretion was infectious on the 14th, 19th, and 23rd day of the disease. The elimination of the virus is irregular, and repeated examinations of 24 hour specimens should be made. The autopsy material from 6 human cases was studied. The lungs invariably contained the infective agent in such concentrations that the mice succumbed in from 6 to 8 days with typical lesions. The pathologic and histologic lesions correspond to those described by Lillie.¹⁷

Further experiments and observations are needed before a definite opinion can be expressed concerning the pathways of transmission of the virus from birds to man. The apparent high infectivity of the dispersed psittacosis virus is shown in the histories in which very short exposures occurred in pet shops, households, and baggage cars where diseased birds were kept. There is considerable evidence that *aerial convection* plays a very important rôle. Monkeys are non-susceptible to subcutaneous administrations of virus while intratracheal injections may induce a disease resembling human psittacosis. The ordinary means of contagion cannot be excluded since the handling of dead birds, feathers, excreta, etc., is frequently reported.

An interesting characteristic of psittacosis outbreaks is the occurrence of multiple cases in the same household. The great epidemics of the past occurred during the winter months. Epidemiologists, therefore, have expressed the opinion that the prevailing disposition to respiratory infections during the colder months of the year favored the spread of psittacosis. Recent observations in California and the United States at large

have shown that the seasonal fluctuations of the disease are influenced by the prevalence of infected birds. Many cases have been seen in September and October, and severe psittacosis is not uncommon in midsummer. Usually, in the fall and early winter, immature carriers, sick birds and their mates, which cannot resist the rigors of transportation, reach their destination. The climatic factors are of significance only in so far as they affect the resistance of the birds and the frequency with which human beings may be brought in contact with them through prolonged exposure in the closed rooms of a winter household.

The majority of psittacosis infections have occurred in people of middle age. The lower susceptibility of children is well known. Intimate exposure of children to the same parrakeets which infected parents or older relatives indirectly, has repeatedly been noted. Careful investigations indicate that these contacts failed to produce disease in children. The greater frequency of psittacosis in women (California 48 ♀ : 22 ♂) is, in part, due to the fact that they are either engaged in the breeding of parrakeets for their livelihood, or as lovers of pets they come more closely in contact with birds. That persons engaged in the breeding, raising, transportation and sale of birds are particularly liable to psittacosis is fully recognized. Of the 70 cases of psittacosis infection reported in California, 27 or 38.5 per cent were in owners of large or small parrakeet aviaries or in members of their families. Three other groups—nurses, physicians, and laboratory workers—are equally exposed to the risk of occupational psittacosis.

The case mortality rate in the 187 cases was 40, or 21.28 per cent, or for the California cases of the period 1929 to 1934, 70 with 14, or 20 per cent, deaths. No fatality occurred below age 38. Very much higher rates have been

reported in the past. In one house epidemic in California, the rate was 100 per cent. It appears reasonable that the systematic inquiries which followed the discovery of 1 fatal case usually revealed 1 or 2 others but milder cases, and thus helped to ameliorate the staggering mortality.

THE EPIDEMIOLOGY OF AVIAN PSITTACOSIS

Although the histories of the California single or group infections of psittacosis mention exposure to sick or dead shell parrakeets, it has unfortunately been possible in but 4 instances to secure the virus for examination from these sources. At the time the cases had been clinically recognized, the carcasses had been buried or destroyed and only the mates of the pairs of budgerigars, which brought the disease into the household, or parrakeets from the same breeding establishment which furnished the epidemic birds, were available for examinations. Thus in 3 instances, apparently healthy shell parrakeets were submitted for study. According to the epidemiologic inquiries, 40 or at least two-thirds of the owners of birds had been exposed to sick or dead parrakeets, while 19 had merely had contact with "healthy" birds. Previous observations left no doubt that apparently healthy parrakeets may transmit a disease to man, but since the fatalities among parrakeets in aviaries are by no means uncommon despite emphatic denials by the bird raisers, it cannot be denied that probably a far larger number of human psittacosis cases resulted from exposure to sick and dead birds. However, it must be kept in mind that Fortner found 30 of the 35 parrakeets involved in the German outbreaks to be clinically normal.

It has been demonstrated in a large series of tests that the acutely ill parrakeets or those suffering from re-

lapses are more liberal disseminators of the virus than those with latent infections, but clinically normal. Unfiltered suspensions of the spleen, liver, contents of cloaca and nasal mucosa, removed at autopsy with separate instruments, have been tested on white mice with the following results:

1. Epidemic birds: spleen and liver contain virus 4; cloaca content infectious 4; nose infectious 3.
2. *Acute* fatal infections not connected with outbreaks: spleen and liver contain virus 36; cloaca content infectious 25; nose infectious 26.
3. *Latent infections*: (64) spleen and liver contain virus 59; cloaca content infectious 21 (2 weak); nose infectious 30.

In the acute stage, both the nasal and fecal elimination of the virus may be demonstrated to occur simultaneously, although birds may be encountered in which either no virus discharge may be demonstrated or it may be found only in the nasal mucus or the cloacal contents. The latter are very rich in virus when the birds exhibit signs of diarrhea or polyuria. Since the kidneys are as a rule highly infectious, while the small intestines and colon are not, it is reasonable to assume that, in some of the birds at least, the urine may be the vehicle for the virus. Parrakeets with splenic or hepatic localization eliminate the psittacosis virus slightly more frequently by the nasal than by the anal route. In a small percentage of birds, the viscera were free from virus while the nasal mucosa was infectious; several presented anatomically the residuals of past infections. Breeding hens may carry the virus in the ovaries or in the yolk of the eggs found in the oviduct; congenital transmission of the psittacosis virus is thus suspected. As a whole, the studies lend support to the epidemiologic observations that a visibly diseased bird is more dangerous than carriers on account of the abundant contamination of the environment with highly infectious fecal material.

The epidemic birds or their mates submitted for examination were found to be immature, less than 6 months old. Experimental infections and numerous surveys have shown that the immature and sexually undeveloped parakeets succumb more readily to psittacosis than the mature breeding birds. For example, the mortality in a flock of 33 *immature* parakeets from infected and non-infected aviaries, injected with a passage of virus active in a dilution of 10^{-8} , was 10, or 33 per cent, while by comparison under identical experimental conditions, 72 *mature* birds from the same breeding establishments showed a mortality of 3, or 4.1 per cent. Equally corroborative are the data collected from the numerous surveys of aviaries. A sample of 100 birds from one aviary consisted of mature and immature parakeets. Anatomically and by mouse tests, 8 per cent of the mature and 48 per cent of the immature birds were found to harbor the virus of psittacosis. In 163 aviaries, the 699 parakeets anatomically suspected of psittacosis were classed according to age as follows: mature: 378 of 3,814, or 9.9 per cent; immature: 321 of 1,850, or 17.3 per cent.

Relatively little is as yet known concerning the flock infection and flock immunity. Mature and immature shell parakeets selected from pens in which latent psittacosis has been demonstrated may be experimentally infected. By comparison with birds from non-infected aviaries, the mortality is lower (infected 17.3 per cent; non-infected 35 per cent). Aside from the lower mortality, the rate of recovery is slightly greater. Within 28 to 36 days, 33 per cent, and within 135 days, 77 per cent of the parakeets from infected aviaries free their organs of the virus. Only 39 per cent of the birds from non-infected premises recover within 51 to 144 days. In flocks of old birds, one may find parakeets which dispose of the virus

inoculated within 4 to 5 days. Our present knowledge is entirely inadequate to explain this resistance; the preliminary studies merely indicate that it is not associated with neutralizing antibodies. Ample data are available to support the general observation that the latent infections in a flock of parakeets may, within 6 to 8 months, be reduced to 1 or 2 per cent. As a rule, a very weak virus may be demonstrated in the spleen and liver. The cloacal content and nasal mucus is, as a rule, free from virus. These carriers are non-infectious; ricebirds exposed in the same cage remain well. However, psittacosis is not eliminated from the aviary.

With the resumption of breeding operations after an elapse of from 6 to 8 months, psittacosis will flare up again and acute parrot fever in young and even old birds will be noted. A variable percentage up to 50 per cent of the 2 to 4 months old parakeets show at autopsy acute or chronic lesions of the disease. The virus is present in the spleen, liver, cloaca, and nose. When mingled with susceptible birds, they readily disseminate the infective agent. Any aviary once infected remains so, despite excellent sanitary management and systematic removal of sick birds. Complete isolation for 1 year may reduce the number of carriers as judged by the anatomical lesions and the demonstration of the virus by mouse tests, but it never eradicates the disease.

That isolation and quarantine, particularly the customary 2 or 4 weeks, offer little or no protection has been amply attested by the experiences of recent years. It will suffice to submit some observations to illustrate the prolonged intrinsic infectiousness of the avian psittacosis carriers and the relatively long incubation time.¹⁸

1. A pair of apparently healthy "parakeets," though suffering from latent psittacosis, infected ricebirds ex-

posed in the same cage on the 1st, 21st, and 40th, but not on the 87th day. The incubation time in the ricebirds was at first 8 to 10 days with death on the 14th and 15th day; later it was 40 days with death on the 48th day.

Of 2 ricebirds exposed to 2 shell parrakeets with latent psittacosis, 1 contracted the disease on the 50th day and was sacrificed in a moribund stage on the 55th day of exposure.

2. The longest time intervals between injection and death observed by Meyer and Eddie were 41, 61, and 98 days following the intramuscular application of the virus. In exposure tests, sickness observed on the 95th day was followed by death on the 106th day.

In order to detect acute avian psittacosis in a shipment of birds, it is obviously necessary to extend the quarantine from 2 to 3 weeks, preferably 5 months. Of course, it must be realized that even this precaution gives no assurance that latent psittacosis is non-existent in a foreign shipment, as observations on Australian¹⁰ and South American psittacine birds¹⁴ have clearly demonstrated. Finally, it is of some interest to know how psittacosis may have invaded the California aviaries. The original stock came from Japan and various other sources, even from Australia. It is now proved that the native Australian budgerigar is spontaneously infected, and thus it is reasonable to assume that avian psittacosis was introduced into the breeding establishments, and since it was not recognized, it spread, through no fault of anyone, to a large percentage of the aviaries. As long as only carefully selected mature birds were distributed, the closed latent infections presented no menace to man. Mass breeding by the inexperienced, distribution and mixing of immature birds from various aviaries, perhaps cyclical factors in the infectiousness of the virus, finally lead to the situation with which the public health

authorities and the industry are now confronted.

PROTECTIVE MEASURES

Theoretically, psittacosis is a disease which could be easily controlled, provided the public would appreciate the possible danger inherent in contact with birds, particularly those of unknown origin. This is obviously impossible when a group of people earn their living by raising parrakeets. Earnest attempts were, therefore, made to eliminate from the traffic those birds which are particularly dangerous spreaders of the disease. After 2 years of struggle to accomplish some degree of protection by means of restrictive measures, such as isolation for 30 days, it became apparent that without an extensive force of inspectors and an expensive system of continuous control the diseased birds cannot be eliminated from the usual local and national traffic.

As already emphasized, in California, psittacosis is not only a public health but also an industrial problem. Both interests are best served by the creation of an aviculture free from psittacosis. The speed with which this program may be executed depends entirely on the fund which may be available to make surveys and to eliminate the aviaries which harbor infected birds.

A recent survey of 164 aviaries by the Department of Public Health has shown that approximately 55 per cent of the establishments yielded by repeated examinations parrakeets which were anatomically, and by mouse tests, free from latent psittacosis. Furthermore, several aviaries, held under observation for nearly 2 years, have furnished non-infected immature birds every time they have been sampled. It is, therefore, reasonable to hope that in due time a nucleus of aviaries free from disease may be created. Plans are in progress to establish a number of so-called "rehabilitation aviaries" which

will furnish the breeding stock for the building up of the industry. These aviaries, managed and maintained by a group of bird breeders, remain under the supervision of the Department of Public Health laboratory in order to insure the permanent elimination of psittacosis in the breeding pens. Until the desired goal—no psittacosis in the American bird industry—has been reached, California will restrict the sale and distribution to lots of parakeets which have been sampled and tested in the laboratory. At the same time, every effort will be made to alleviate the hardship and suffering imposed upon the industry by the restrictive measures which of necessity had to be adopted in order to protect the public health.

REFERENCES

1. Elkeles, G., and Barros, E. Die Psittakosis. *Ergebn. d. Hyg. Bak. Immunität. u. exp. Therap.*, 12:529-639, 1931.
- Armstrong, Charles. Psittacosis. *Pub. Health Rep.*, 45:2013-2023, 1930.
- Sturdee, E. L., and Scott, W. M. A disease of parrots communicable to man (psittacosis). *Reports on Public Health and Medical Subjects*, No. 61, London, 1930.
- Roubakine, A. General review on psittacosis. *League of Nations Monthly Epidemiological Report*, April 15, 1930, 9th year, No. 4, pp. 141-175.
2. Sandoer, S. A., and Coburis, C. E. Psittacosis in Kansas. *J. Kansas Med. Soc.*, 31:280, 1930.
3. McIntosh, J. W. Some aspects of the outbreak of psittacosis in Burnaby, B. C. *Canad. Pub. Health J.*, 22:562-568, 1931.
4. Leichtenstern. Über "infektiöse" Lungenentzündungen und den heutigen Stand der Psittakosis-Frage. *Zentralbl. f. allg. Gesundheitspf.*, 18:241-303, 1899.
5. Bachem, Selzer and Finkler. Die von Zülpich im Sommer 1909 ausgehende Epidemie von Lungenerkrankungen und der heutige Stand der Psittakosisfrage. *Klin. Jahrbuch*, 23:539, 1910.
6. Schmid, H. J. Über eine psittakoseähnliche Epidemie in einem Tierspital. *Ztschr. f. klin. Med.*, 117:563-593, 1931.
- Frei, W. Zur Epidemiologie der von Dr. H. J. Schmid beschriebenen psittakoseähnlichen Epidemie. *Ztschr. f. klin. Med.*, 117:594-601, 1931.
7. Roch, M., and Wohlers, H. Psittacosis. *Rev. méd. de la Suisse, Rom.*, 50:65-72, 1930.
8. Widowitz, J. Über drei Fälle von Psittacos's. *Wien. klin. Wochenschr.*, 43:195-196, 1930.
9. Fisher, H. R., and Helshy, R. J. Three cases of psittacosis with two deaths. *Brit. M. J.*, 1:887-890, 1931.
10. Rabinowitz, M. A., and Livingston, S. H. Psittacosis. Report of five cases. *Arch. Int. Med.*, 49:464-470, 1932.
- Polayes, S. H., and Lederer, M. Psittacosis. *Arch. Int. Med.*, 49:253-269, 1932.
11. Fortner, J., and Pfaffenberg, R. Über Psittakose. *Centralbl. f. Bakteriologie*, 1. Abt., Orig., 114:331-336, 1934.
12. Bedson, S. P. The nature of the elementary bodies in psittacosis. *Brit. J. Exper. Path.*, 13:65-72, 1932.
- Bedson, S. P., and Bland, J. O. W. Morphological study of psittacosis virus, with description of developmental cycle. *Brit. J. Exper. Path.*, 13:461-466, 1932.
- Bedson, S. P. Observations on developmental forms of psittacosis virus. *Brit. J. Exper. Path.*, 14:267-277, 1933.
13. Krumwiede, Ch., McGrath, Mary, and Oldenbusch, Carolyn. The etiology of the disease psittacosis. *Science*, 71:262-263, 1930.
14. Meyer, K. F., and Eddie, B. Latent psittacosis and Salmonella psittacosis infection in South American parrotlets and conures. *Science*, 79:546-548, 1934.
15. Meyer, K. F., and Eddie, B. Spontaneous psittacosis infections of the canary and butterfly finch. *Proc. Soc. Exper. Biol. & Med.*, 30:481-482, 1933.
16. Rivers, T. M., and Berry, G. P. A laboratory method for the diagnosis of psittacosis in man. *Proc. Soc. Exper. Biol. & Med.*, 29:942-944, 1932.
17. Lillie, R. D. The pathology of psittacosis. National Institute of Health, *Bull. No. 161*, Washington, 1933.
18. Pesch, K. L., and Siegmund, H. Untersuchungen über den Erreger der Psittakosis. *Arch. f. Hyg.*, 105:1-14, 1930.
19. Meyer, K. F., and Eddie, B. Psittacosis in the native Australian budgerigars. *Proc. Soc. Exper. Biol. & Med.*, 31:917-920, 1934.

Studies of Correlated Human and Bovine Brucellosis*

Statistical and Serological

R. V. STONE, F.A.P.H.A., AND EMIL BOGEN

*Director, Bureau of Laboratories, Los Angeles County Health Department, and
Pathologist, Olive View Sanatorium, Los Angeles, Calif.*

THE part played by the ingestion of raw milk from cattle infected with *Brucella abortus* in the pathogenesis of undulant fever is still minimized by many of the foremost workers in the field,¹ as well as by the practical dairymen,² who resent any additional aspersions on their product. The dramatic increase in the number of reported cases of this malady during the past few years in every state of the Union³ makes this a matter of more than academic interest. The present study may aid in the elucidation of some of the moot questions in this situation, and lead to a better evaluation of the factors concerned.

BOVINE INFECTION

Since goats' milk is consumed in this country only in exceptional cases, the caprine sources of infection cannot be expected to play here the important rôle which they have been shown by Bruce^{4, 4a} and others,⁵ to hold in reference to Mediterranean undulant fever. In several instances hogs have been shown to be the responsible agents,⁶ infection resulting from contact with the flesh of infected animals.⁷ How-

ever, neither porcine nor caprine contacts can be discovered in the histories of the vast majority of the cases of *Brucella* infection thus far reported in this country, and it is natural that suspicion should fall upon the cow as an important agent in the transmission of this disease.^{8, 8a}

The prevalence of infectious abortion due to the *Brucella abortus* in cattle has been attested by observers all over this country,⁹ as well as by many abroad.¹⁰ The studies of Meyer and his coworkers^{11, 12} have shown that California cattle have not escaped this disease. Not all herds, however, shows the same amount of infection. Examination of all the cattle in 3 herds supplying 3 institutions for the care of tuberculous patients in Los Angeles County showed that the incidence of infection varied from 6 to over 50 per cent, as revealed by agglutination titers of 1/50 or higher, with an average of nearly 30 per cent showing agglutination in titers of 1/100 or higher.

HUMAN AGGLUTINATION TESTS

An attempt was made to determine the incidence of infection with *Br. abortus* among the persons consuming the raw milk from these herds. During the first half of the year 1930, more than 1,200 specimens of blood were

* Read at a Joint Session of the California Association of Dairy and Milk Inspectors and the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

TABLE I

AGGLUTINATION TESTS ON COWS

Institution	Total	Negative	Positive at		Per Cent Positive	
			1/50	1/100	1/50	1/100
A	132	32	22	47	52	35
B	32	24	0	2	6	6
C	31	15	5	4	28	12

taken from patients at these 3 institutions, and tested for agglutinins of *Br. abortus*, by the macroscopic method recommended by the University of California Committee.¹³ In institution A, consuming milk from the most heavily infected herd, 66 instances of positive agglutination were discovered, while the 2 institutions, B and C, receiving their supplies from the least contaminated cattle, did not present a single positive test. Moreover, none of the 176 persons examined upon admission to institution A before they had begun to consume the contaminated milk, showed the presence of agglutinins for these organisms.

TABLE II

AGGLUTINATION TESTS ON PATIENTS

	Total	Positive
A: Old Patients	842	65
Employees	12	1
New Admissions	176	0
B	56	0
C	98	0

CLINICAL SIGNIFICANCE

The above figures appeared to show conclusively that the occurrence of positive agglutination tests for *Br. abortus* in the blood of these persons was a direct consequence of the drinking of raw milk from the cattle which showed a high incidence of positive reactions. Since all of these results were secured in the course of a routine serological examination of all persons in the institution, and not in response to

any clinical indications, some doubt was entertained as to their clinical significance, and it was even suggested that this merely represented an immunization of the patients by the ingestion of dead or living organisms without the production of actual infection. It was admitted that perhaps there might have been symptoms in some of these cases which had been overlooked or attributed to other causes. This was indicated by the results of other studies carried on by the Bureau of Laboratories of Los Angeles County, for instance, where of 1,500 sera submitted for examination for syphilis, in which there was no indication of febrile disease, only 1 specimen was found to contain agglutinins for *Br. abortus* in dilutions of 1/100 or higher, while 83, or nearly 22 per cent of all the "typhoid-Widal negative" sera submitted for examination for the possibility of typhoid fever (378 in number) were found to contain such agglutinins in this or higher dilution.¹⁴ Since positive agglutination for these organisms appeared so much more frequently among the groups showing symptoms of febrile disease than among others, it appeared logical to look for a higher incidence of symptoms in those showing such positive agglutination tests. Accordingly, the individuals showing positive agglutination reactions were subjected to special scrutiny.

DURATION OF EXPOSURE

The 66 individuals possessing agglutinins for *Br. abortus* constitute 7.7 per cent of the 854 who were tested in

Sanatorium A. When we consider the duration of stay in the institution, we find that the incidence of the positive tests is much higher in those who have had a longer exposure—nearly 15 per cent in those who were at A for more than 2 years, and less than 2 per cent for those who entered during the current year. It is quite to be expected that the incidence of the infection is related to the duration of exposure, but it suggests that the apparent immunity of those not so infected is merely relative, or illusory, and that heavier or more sustained exposure might result in much higher incidence of the disease.

HEIGHT OF TITER

On the other hand, the patients having the longest exposure to the disease have relatively low titers of agglutinins in their blood, and the highest titers occur in those who had been in the institution for from $\frac{1}{2}$ to 1 year prior to the beginning of this study.

ings obtained by repeating the tests in the positive cases during a half-year or so. In general, the successive tests show a diminution of titer, especially in the patients who had been in the institution for a long time, while in the more recent patients the titer continued to increase.

SEX AND AGE

Although the population of the institution comprises somewhat more females than males, a few more males gave positive agglutination tests than females. This slight preponderance is in harmony with the figures generally reported by other investigators, but the explanation sometimes given, that the outdoor exposure of the males to contact with the living infected animals or their tissues in the slaughter houses is evidently not the solution here.

The age incidence here is at variance with that commonly found, the proportion of subjects under 10 being much

TABLE III

DURATION OF EXPOSURE TO RAW MILK AND TITER
MAXIMUM TITERS

Duration of Exposure	Total Cases	Total Per Cent		1/20	1/40	1/80	1/160	1/320	1/640	1/1,600
		Positives	Positive							
Over 2 years	91	13	14	2	3	3	3	2	..	..
Over 1 year	120	16	14	1	2	3	6	2	2	..
6 mos.—1 year	178	13	8	3	1	1	3	..	4	1
Employees	12	1	8	..	..	..	1	..	..	..
Under 6 mos.	250	19	7	1	6	3	6	3	..	..
During study	203	4	2	1	..	..	2	1	..	..
Total	854	66	..	8	12	10	21	8	6	1

Since it has been shown in laboratory experiments as well as field studies that the agglutinins to this organism may appear quite rapidly, or may increase over the course of many months, and that they tend gradually to disappear, our findings appear quite consistent with what might be predicted from these general considerations. This impression is borne out by an examination of the find-

greater than that previously reported. The incidence of the disease among the younger patients is more than twice that found among the older ones. The markedly greater consumption of milk by the younger patients (each child consumes a quart of milk daily in addition to the regular meals, while the adults have no such fixed ration, and are noted on the wards to consume much

less), together with the generally longer duration of hospital and sanatorium stay by the younger patients, thus increasing the total amount of exposure to the milk-borne infection, may serve to account for these differences. The lack of similar findings in the reports of other studies seems to be mainly due to the fact that insufficient numbers of children were tested.

STAGE OF TUBERCULOSIS

The stage of tuberculosis in these 66 persons was definitely earlier than that of the average of the patients, only half of them being far advanced pulmonary cases, while three-fourths of the patients have already reached that stage; more than one-fourth of the positive agglutination subjects were juvenile or hilar types, although they represented but one-eighth of the sanatorium patients. The titers in these groups bring out this phenomenon even more strongly, since the patients showing high titers of 1/320 or more, included less than one-fourth of far advanced cases. This is contrary to our initial supposition that patients with advanced disease, and especially with intestinal ulceration, should be more susceptible to infection, and suggests that the factors responsible for the invasion and agglutinin formation are not simple mechanical or infective lesions providing portals of entry for the organisms. Perhaps the relatively larger consumption of milk by the less severely affected patients may help to explain this phenomenon.

COURSE OF DISEASE

The course of the disease in the 66 persons showing evidence of complicating *Br. abortus* infection was significantly milder than has been the general experience of tuberculous patients in this institution. Of the 30 patients so far discharged, 27, or 90 per cent, have been recorded as arrested or im-

proved, and only 2 (or less than 7 per cent) died in the institution.

An autopsy was performed on 1 patient with a positive agglutination in dilutions of 1/100, and a history of irregular temperature rises, but far advanced pulmonary tuberculosis of fibroid type with death from hemorrhage was the only finding noted. The exacerbation of the tuberculous process that might be expected to accompany a complication characterized by an increased monocytosis, as suggested by the work of Sabin and her coworkers,¹⁵ and by Theobald Smith,¹⁶ was conspicuously absent in this series, and one is almost tempted to suggest a beneficial effect. However, the probable explanation is that the patients doing well so far as tuberculosis is concerned, consumed more milk, thereby exposing themselves to more massive and frequent infections than those in whom intestinal and laryngeal complications had made milk drinking less pleasant, with consequent difference in the incidence of the infection in the two groups.

TEMPERATURE CURVES

Since daily temperature records were available for all of these patients, it should not appear difficult to pick out those suggestive of undulant fever. However, in more than one-third, there was so much elevation of temperature that was obviously or apparently due to active tuberculous disease that it was impossible to consider any part of it separately as related to the abortus infection. Another third of the records failed to disclose any distinctive departure from a normal temperature curve. In but 18 instances were there evidences of fever that could not be explained by other evident causes. The majority of these were in children or other individuals presenting little evidence of tuberculous activity, and it is perhaps significant that two-thirds of them occurred in groups of patients

TABLE IV

TITER AND FEVER

	<i>Afebrile</i>	<i>Occasional</i>	<i>Continuous</i>	<i>Totals</i>
1/20-1/60	13	6	11	30
1/160	12	12	12	36
	<hr/>	<hr/>	<hr/>	<hr/>
Totals	25	18	23	66

manifesting the higher titers of agglutinins.

This suggests that the occasional febrile disturbances recorded bear a direct relationship to the abortus infection.

SKIN TESTS

Intradermal inoculation with a purified abortus protein¹⁷ for the detection of sensitization to this organism was performed in June, 1930, in 39 individuals, and in only 13 were the reactions greater than those elicited by a control inoculation of paratyphoid vaccine. The tests were repeated in August on 42 individuals with a whole abortus bacillus killed vaccine,¹⁸ and 14 positive reactions were obtained. Altogether of 45 individuals tested, less than half reacted positively to either of the antigens used, and in both the majority of the positive reactions were rather mild, and often questionable. In several instances with the use of the whole killed bacillus antigen, there were reactions with fever following the inoculation; 1 patient had a systemic reaction with severe chills, and in another there resulted a slough which persisted for several weeks.

Most of the positive skin tests were obtained on patients who showed a rather high agglutinin titer, and conversely, most of the patients with the higher agglutination values showed a positive skin test. No positive skin test was obtained on any of the 5 individuals with negative agglutination tests. In several individuals the positive skin test, especially when accompanied by

systemic reactions was followed by a rather marked eosinophilia, reaching 14 per cent in 1 case, but this was not a uniform finding. Hematological studies were otherwise disappointing, the monocytosis reported by Smith and the leukopenia by other workers were generally absent, or otherwise explainable.

CLINICAL MANIFESTATIONS

Consideration of the clinical manifestations in the 66 individuals who had positive agglutinins for *Br. abortus* led to a tentative diagnosis of undulant fever in 6 instances. All were females, 4 below the age of 15, and 2 in their 30's. Three were recorded as preventorium cases or juvenile type tuberculosis, 2 were minimal cases, and 1 far advanced phthisis. Five had been in the institution for more than 6 months, and 1 had entered just before the beginning of the study, but did not develop symptoms until over 4 months later. In each there was a history of an unexplained fever, usually recurrent or undulating in type, generally without severe accompanying symptoms, disappearing after some months. The reports show that all these were of the mild or ambulatory type, but nevertheless all had sufficient symptoms to command attention and produce some distress. Skin tests were positive in 4 and negative in 1, the other not having been tested. Agglutinins were present in a titer of 1/800, 1/640, 1/400, 1/200, 1/200, 1/50, respectively. In 2 they were absent on later tests, in 4 they were somewhat increased.

POSSIBLE UNDULANT FEVER

In fully a score of the remaining patients there was some evidence to justify the suspicion of undulant fever, but the cases were insufficiently clear-cut to establish a definite diagnosis. Just half were males, and half under the age of 20. Half of them were juvenile or preventorium or minimal cases, the other

10 were mostly far advanced. Ten of them had arrived during the preceding 6 months, or the first months of our investigation. All but 1, who had not recorded his temperature, had had fever during their sanatorium stay, but in the majority of the cases it was more continuous than in the more typically undulant fever types, in some being mixed with the elevation resulting from active tuberculous disease. In only 4 was there a strongly positive skin test; in 3 there was a slightly positive reaction, and in 10 the test was negative. The titers on agglutination were quite high, in 1 case 1/1600, and more than half of them were 1/100 or higher, only 1 being as low as 1/20, and in this case there was a partial agglutination as high as 1/200.

NO EVIDENCE OF UNDULANT FEVER

It was difficult, however, to elicit any evidence of clinical disturbance resulting from brucellosis in 40 individuals with positive agglutination tests. Of these, 25 were males, and 25 were over 20 years of age. Nearly half of them had been at the sanatorium for less than 6 months and most of them had far advanced pulmonary disease on admission. Nevertheless most of them were practically afebrile throughout their stay in the institution, and the 12 who did have fever could easily attribute it to their tuberculous lesions. The agglutinin titers in this group were generally low, only 2 being higher than 1/200 and the skin tests were negative in the majority of them.

SUMMARY OF CASES WITH POSITIVE AGGLUTINATION TESTS

In summarizing the clinical manifestations we may note that the patients manifesting symptoms showed a higher titer of agglutinins, were younger, and in an earlier state of tuberculosis, mostly female, and had been in the institution somewhat longer than those

who did not show such clinical indication. Taking the other aspect, we may note that of the patients with positive agglutination tests for undulant fever, those with the high titers showed more clinical evidence of brucellosis, as did also those who were younger and in an earlier stage of the disease but longer in the institution, that more of the women showed symptoms than did the men, and only half of those with positive skin tests showed other clinical evidence of the disease.

Additional support for the suggestion that undulant fever infection was more apt to occur in the healthier patients on account, perhaps, of their more generous consumption of milk is the fact that the symptoms that appeared to be due to this infection were present in only 1 of the far advanced patients, while in 5 of the juvenile or minimal types symptomatic evidence did exist. No evidence of such symptoms could be discovered in three-fourths of the far advanced cases; some such symptoms appeared in the majority of earlier ones.

It appears that of the 66 patients (constituting nearly 8 per cent of the entire number exposed to drinking the infected raw milk) who developed agglutinins against the *Br. abortus*, 6 cases showed sufficient clinical manifestations to warrant a tentative diagnosis of undulant fever, while more than 3 times this number had symptoms, otherwise unexplained, which may have been attributable to this cause. This is in accord with the summary of Alice Evans "Chronic Brucellosis."^{18a} In no instance, however, were the symptoms of the grave nature generally associated with Mediterranean or Malta fever, and no deaths could be reasonably attributed to this cause.

COMPARISON WITH INCIDENCE PREVIOUSLY REPORTED

It is interesting to review the incidence of agglutinin formation and clin-

ical undulant fever reported by other observers in connection with the consumption of raw milk from cattle suffering with infectious abortion. Unfortunately, the data for such comparison are fragmentary and often lacking in facts necessary for correlation, but it may be noted that in general surprisingly good agreement exists with our figures. Thus King,¹⁹ in New York, found that about 13 per cent of the patients who drank infected milk developed agglutinins to *Br. abortus*, while Hardy,²⁰ in Iowa, found a fraction under 10 per cent whose agglutinins were active in a titer of 1/20 or higher. In King's series, 12 per cent of the positive cases showed clinical evidences of undulant fever. Our corresponding figures of 11 per cent of exposed patients developing agglutinins, and 8 per cent developing agglutinins presenting clinical manifestations, is not far from the figures reached by other investigators.

RE-CHECK OF BRUCELLIASIS AGGLUTINATION TESTS—OCTOBER—DECEMBER

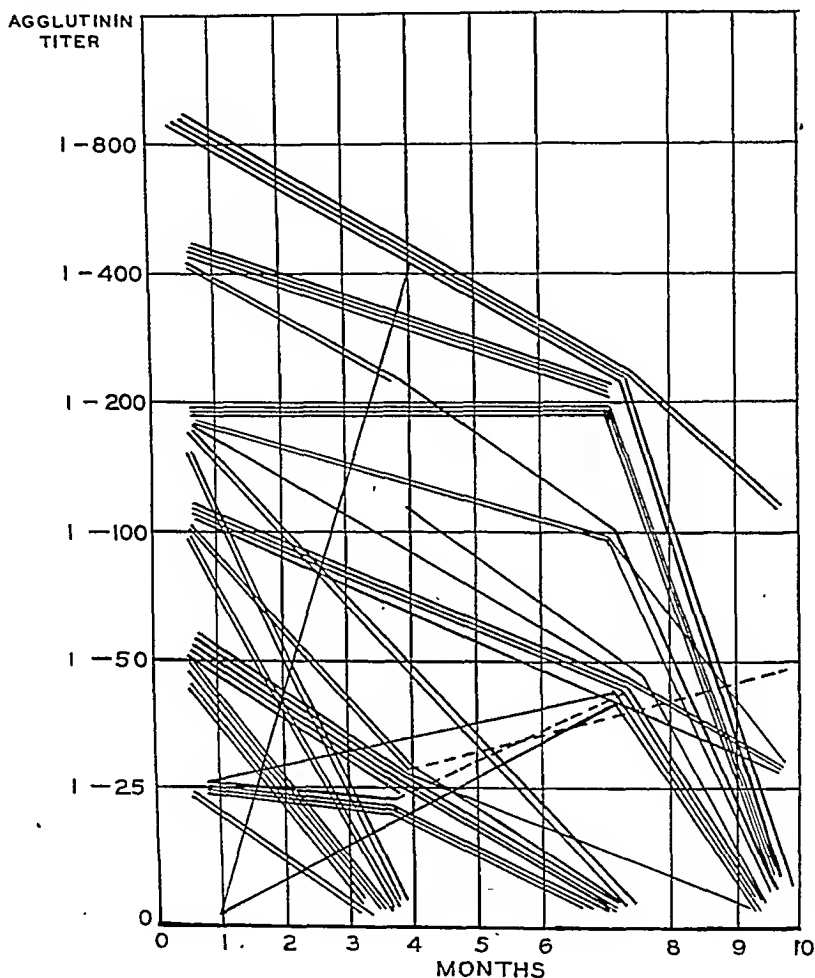
Six months after the completion of the first tests on all patients at Sanatorium A and the consequent testing and clearing out of the herd, all of the cattle reacting positively to agglutination tests for *Br. abortus*, sera were taken for repetition of the tests on all patients in the institution. More than 920 sera were tested from 850 individuals. The results are strikingly in accordance with the conclusions drawn from the earlier figures. Out of 500 patients and employees who had come to A since the milk had been freed from the infectious organisms—at first by pasteurization, and later by the use in the herd of only those cattle that had been repeatedly found negative to agglutination tests—not a single instance of positive agglutination was discovered. On the other hand, out of 350 patients who had been at A previous to this change, positive agglutination tests were reported in 10

instances. Seven of these had also been found to possess agglutinins in the previous study, 2 had not been tested at the previous series, although they had been at A for a long time, and the 10th had had a negative agglutination test taken soon after his admission, several months before the herd had been cleaned up, and therefore had been drinking the milk from positive cattle for several months after this test had been made.

On the tests made in this re-check, 25 patients, who had shown positive tests on one or more occasions previously, were found to be negative at this time. More than half of these had already lost their agglutinins when tested in August, within 4 months of the time the herd was cleaned out, and most of the others tested in August had shown a marked drop from a much higher titer. The rate at which agglutinins were lost was not, of course, exactly the same in each case, but the great majority of the curves followed approximately the same slope, representing generally a loss of about half the agglutinin titer every 60 days. Successive readings on the sera that did not entirely lose their agglutinins also showed approximately the same rate of disappearance of the titer (Graph A).

The significance of this uniform reduction in the titer of the sera is not entirely clear. If it were merely a passive immunity due to absorptions of antibodies in the milk, the rate of disappearance of the antibodies should be many times faster, since we have learned from studies of passive immunization against diphtheria, scarlet fever, and other diseases that the antibodies in injected sera are usually completely excreted within a few weeks. On the other hand, active immunization from true infection would be expected to persist much longer, and to manifest less uniformity in its disappearance. The most plausible conclusion appears to be that the organisms do enter the tissues, and

GRAPH 'A'
CHANGES IN AGGLUTININ TITER



thus give rise to active immunity, but that they are unable to produce real infection, and rapidly die off, or perhaps that the antigenic protein products of the bacteria may be absorbed without viable organisms even penetrating the intestinal mucosa. If such antigenic absorption were possible, it might explain why the immunity is so mild and why it disappears so consistently, as the antibodies following vaccination in typhoid and similar conditions. In so

far as this may be the true situation, of course, it serves greatly to minimize the public health importance of milk-borne bovine infectious absorption. It is premature to assert the impossibility of such antigen absorption through the intestinal tract, but it may at least be recognized that it is very unlikely, and that actual invasion by organisms of very low virulence and therefore short lived infections are a much more probable solution.

CONCLUSIONS

The results of this investigation indicate that the ingestion of raw milk obtained from cows infected with contagious abortion and showing positive tests for agglutinins to *Br. abortus* in their blood is responsible for the development of similar agglutinins in the blood of some consumers. This has been found to occur in about 8 per cent of those continuously exposed to the ingestion of heavily infected raw milk, but varies with the duration of exposure, the amount of infection in the herd, and the amount of the raw milk so consumed. No particular sex or age susceptibility to this infection has been found. No effect of tuberculosis or other disease upon the development of such agglutinins is apparent, except in so far as they affect the amount of exposure to the infected milk. The development of such agglutinins has not been found to exercise any marked effect on the course of the tuberculosis. More than half of the patients developing agglutinins to *Br. abortus* give no other manifestation of the infection and, therefore, come well within the groups described as sub-clinical, asymptomatic, or purely serological brucellosis. About one-eleventh of them manifest clinical symptoms warranting a diagnosis of undulant fever, and an additional group present other symptoms that might be attributable to the same cause. The disease manifestations are, however, comparatively mild, conforming, therefore, to the bovine type of infection, as described by Theobald Smith, rather than to the more virulent types that are frequently described from caprine or porcine sources. It constitutes, however, a definite disease entity, and cannot be disregarded.

REFERENCES

1. Smith, Theobald. The Relation of *Bacillus Abortus* from Bovine Sources to Malta Fever. *J. Exper. Med.*, 43, 2. Pt. 1, 207, 1926.
2. Buchnell, H. H. Vindicating the Innocent. *Los Angeles Times, Farm and Garden Magazine*, Mar. 23, 1930, p. 1.
3. Simpson, Walter M. Undulant Fever (Brucellosis). *Ann. Int. Med.*, 4:238 (Sept.), 1930.
4. Bruce, D. Notes of the Discovery of a Micro-organism in Malta Fever. *Practitioner*, Sept., 1887, p. 161.
- 4-a. Bruce, D. Notes on Mediterranean or Malta Fever. *Brit. M. J.*, 11:59 (July), 1898.
5. Hughes, L. Undulant Fever (Malta). *Lancet*, 1896, p. 239.
6. Traub, J. *A.J.P.H.*, 20:935 (Sept.), 1930.
7. Hardy, A. V., and Hudson, C. F. The Skin as a Portal of Entry in *Br. melitensis* Infection. *J. Infect. Dis.*, 45:271, 1929.
8. Evans, Alice C. *J. Infect. Dis.*, 22, 1918.
- 8-a. Evans, A. C. *J. Infect. Dis.*, 23:354-372, 1919.
9. Carpenter, C. M., and Baker, D. W. A Study of *Brucella Abortus* Infection from Fifty Herds Supplying the City of Ithaca, N. Y. *Cornell Vet.*, 17, 2:236, 1927.
10. Bang, B. The Etiology of Epizootic Abortion. *J. Comp. Path. & Therop.*, 10:125, 1897.
11. Meyer, K. F., and Shaw, E. B. A Comparison of the Morphologic Cultural and Biochemical Characteristics of *B. Abortus* and *B. Melitensis*. *J. Infect. Dis.*, 27:173, 1920.
- 11-a. Fleischner, E. C., and Meyer, K. F. Observations on the Presence of *Bacillus Abortus* in Certified Milk. *Am. J. Dis. Child.*, 14:157, 1917.
12. Henry and Traub. Milk Inf. with *B. Abortus*. *J. Infect. Dis.*, Nov., 1930, p. 380.
13. University of California Committee for the Study of *Brucella* Infections. *Diagnostic Laboratory Procedures*. May 8, 1930.
14. Stone, R. V. *Report of Salt Lake City*.
15. Sabin, F. Rôle of the Monocyte in Tuberculosis. *Bull. Johns Hopkins Hosp.*, 37:231, 1925.
16. Smith, Theobald. *Focal Cell Reactions in Tuberculosis and Allied Diseases*, p. 197.
17. Fleischner, E. C., and Meyer, K. F. The Bearing of Cutaneous Hypersensitiveness on the Pathogenicity of the *Bacillus Abortus Bovinus*. *Am. J. Dis. Child.*, 16:268, 1918.
18. Giordano, A. S. *Brucella Abortus*, Intradermal Reaction. *J.A.M.A.*, 93:1957 (Dec. 21), 1929.
- 18-a. Evans, Alice C. Chronic Brucellosis. *J.A.M.A.*, 103:665 (Sept. 1), 1934.
19. King, M. J. *Brucella Abortus* Infection of Milk. *New Eng. J. Med.*, 201:918, 1929.
20. Hardy, A. V., and Jordan, C. F. Undulant Fever, with Special Reference to a Study of *Brucella* Infection in Iowa. *Pub. Health Rep.*, 45 (Oct. 10); 45 (Oct. 17), 1930.

ACKNOWLEDGMENT—Credit is due for aid and assistance, without which this study could not have been carried on, to:

Dr. J. L. Pomeroy, County Health Officer, whose example in conducting work beyond the usual routine is an inspiration to his staff.

Dr. Wilcox, Mrs. Weigel, Mr. Choate, of the Los Angeles County Health Department.

Dr. Bucher, Mr. Van Fossen, Mr. Loomis, Dr. Miller, of the Olive View Sanatorium.

Dr. L. M. Hurt, Los Angeles County Livestock Inspector.

Professor K. F. Meyer of the University of California.

Dr. A. S. Giordano of South Bend, Ind.
Mrs. Irish of the Barlow Library.

Effectiveness of Radio in Health Education

C. E. TURNER, DR.P.H., F.A.P.H.A. (*Life Member*)
VIVIAN V. DRENCKHAHN, AND MARIA W. BATES

Department of Biology and Public Health, Massachusetts Institute of Technology, Cambridge, Mass.

THIS brief study was made in an attempt to determine the size of the radio audience which listens to educational health broadcasts, and to determine what effect these broadcasts produce on the health behavior of listeners. We also wished to find out who listens, when he listens, and what kind of broadcast is preferred.

Reports of only two previous investigations of radio health broadcasts had apparently been published. The first¹ reported that in one American city, (Racine, Wis.) where 6.9 per cent of the homes were reached by public health nurses, 33 per cent of the homes in May and 29 per cent in November listened more or less regularly to broadcasts of the local health department. The other investigator² attempted to check the radio audience of a county board of health broadcast (Jefferson County, Ala.) by the number of persons requesting copies of the lectures. Fifty people sent for these reprints. In the belief that only 1 per cent of a radio audience request material announced during a broadcast, it was estimated that 5,000 people were reached during the 12 lectures.

The effectiveness of radio in health education is important because of the time and money spent by official and nonofficial health agencies throughout the United States in preparing and in giving health broadcasts. In 1931, the

U. S. Public Health Service reported that 15 of the 48 state health departments broadcast regularly (weekly, monthly, or semi-monthly), and 6 others broadcast irregularly on public health subjects. Questionnaires filled in by the health departments of the 200 largest cities in the country showed that 18 of these cities broadcast regularly and 17 at irregular intervals on health subjects.³

Through the courtesy of Elizabeth C. Nickerson, Director of the Bureau of Public Health Instruction, Connecticut State Department of Health, the writers learned of a study made by that department in 1931 concerning the amount of broadcasting done by medical societies throughout the United States. Ten of the 15 county medical societies who reported in this study broadcast regularly. The state medical societies of Illinois, Massachusetts, Michigan, and New Jersey, as well as the San Francisco Heart Commission and the New York Tuberculosis and Health Association were reported to be broadcasting once a week or oftener.

In 1933, of 312 national voluntary organizations with public service objectives who returned questionnaires to the National Advisory Council on Radio and the Federal Office of Education, 45 reported broadcasting regularly and 76 occasionally.⁴ Another study made the same year showed that 10 state depart-

ments of education were sponsoring regular radio programs. Of 126 educational broadcasts given by 7 state departments of education, and classified according to subjects, 5 were on physical education and health topics.⁵

THE GROUP STUDIED

The data of this study were collected by means of questionnaires filled in by secondary school pupils in two Massachusetts communities, Arlington and Malden. Arlington (population 36,000) has a good program of general education in its public schools, but had not had a directed health education program until the year this study was made. Malden (population 58,000) has had a well organized health education program for 12 years.

Through a process of trial and revision a questionnaire was developed to be used as a social study project in social science classes in the secondary schools. Careful directions were given to the classroom teachers. Each pupil was asked to fill out one questionnaire for himself in the classroom, and to take home a second identical form to fill out for some member of his household over 21 years of age. Pupils were asked not to sign the questionnaire. They understood that their records were not to be graded either for them as individuals or for a class record, and that they were contributing to the study of a large group. This approach was made in order to get a careful and honest report from the pupils.

The items of the questionnaire were as follows:

1. City
2. School
3. Grade
4. Teacher
5. Sex
6. Age (If this sheet is being filled in at home for a member of your household, please answer questions 7 and 8.)
7. Relation to pupil
8. Occupation
9. Have you a radio in your home?

10. Is your radio working?

11. Give the following information about the health broadcasts you have heard in the week ending Sunday at midnight:

(a) What was the broadcast about?

(b) Name the health department, association or company which gave the broadcast

(c) Did you listen through to the end of the broadcast?

12. If you listen regularly to health broadcasts, list them below:

(a) Name the agency

(b) Tell why you like or do not like the broadcast

(c) How do you get information about this broadcast?

13. State whether you prefer a health broadcast to be (1) talk, (2) dialogue, (3) play, (4) questions and answers.

14. List the suggestions given in health broadcasts which you have put into practice, and name the agency which gave each suggestion:

(a) What was the suggestion?

(b) Name the agency

15. State the time of day you usually listen to the radio morning, afternoon, evening. (Do not check, give hours as from 7 to 8 o'clock.)

16. Upon what subjects would you like to hear health broadcasts?

17. What health literature have you sent for as a result of radio broadcasts given during the week ending last Sunday at midnight?

18. What health products do you hear advertised over the radio?

19. What is the best straight health broadcast (not an advertising program) that you remember?

20. Date (Additional information, which should be numbered according to the questions, may be written on the other side of this sheet.)

The total number of questionnaires tabulated was 2,143. Of these 1,348 (62.8 per cent of the total number) were filled in by pupils in the classrooms, while the remaining 795 (37.2 per cent) were filled in by pupils of the same group for members of their households. Of the 795 adults included in the study, 486 (61.2 per cent) were women, and 309 (38.8 per cent) were men. Boys numbered 713 (52.9 per cent) of the total number of pupils, and girls 635 (47.1 per cent). More than

60 per cent of the total number of pupils were between the ages of 16 and 18 years, and 97 per cent between 13 and 19.

The occupations of men and women included in this study are as follows:

Men	Per Cent	
114	36.9	Engaged in business
76	24.6	Skilled laborers
47	15.2	Unskilled laborers
20	6.5	Professional men
52	16.8	All others
<i>Women</i>		
381	78.5	Housekeepers
75	15.4	Engaged in business
30	6.1	All others

RADIOS

Nearly every home (95 per cent) had a radio. Nearly all of these (92 per cent) were in working order.

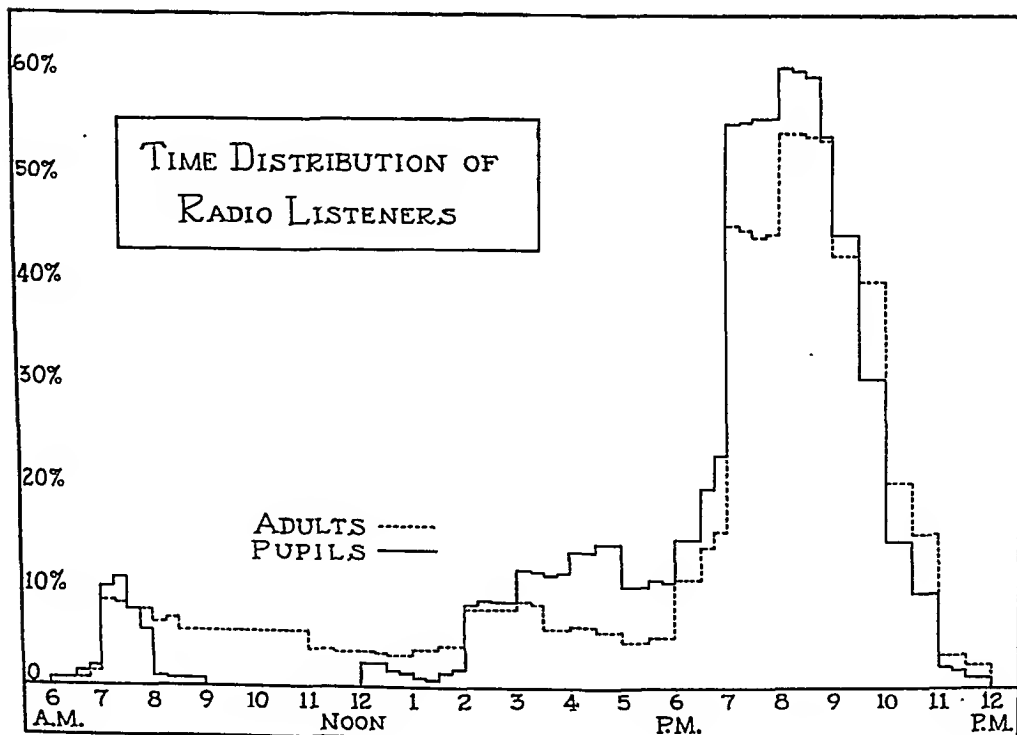
TYPES OF PROGRAMS MOST FREQUENTLY HEARD

Many advertising programs were listed as health programs. The products

most frequently heard advertised over the radio for their health value were, in order of frequency, food, toothpaste, and medicine. Such advertising programs were reported as health broadcasts 1,280 times per 1,000 questionnaires returned from Arlington and 486 times per 1,000 questionnaires returned from Malden.

The programs dealing directly with some phase of health (non-entertainment programs) most often heard during the week preceding the questionnaire were, in order of frequency: (1) The Tower Health Exercises of the Metropolitan Life Insurance Company (183 times), (2) Health Talks for Horlick's Malted Milk (133 times), (3) Talks on health of the Parker Dental System (84 times), (4) Health talks for Stanco, Inc. (53 times), (5) Talks on health and disease for Sharpe and Dohme (32 times), (6) Talks on child training and mental hygiene for Cream of Wheat Corporation (16 times), (7) Massa-

FIGURE I



chusetts Department of Public Health (7 times).

There had been 4 State Health Department broadcasts during the period reported upon. This represents roughly 1 person out of 1,000 who heard each of these broadcasts. The number 7 is so small, however, that it is a poor index of the number of people listening to this type of program. One-tenth of one per cent may be too high or too low.

It would seem that health departments might do well to consider ways and means of securing larger audiences. It might be worth while to coöperate with such already-formed groups as women's clubs, societies, or school health classes, by supplying information at pre-arranged times on health topics which are being considered in their programs. For example, members of a women voters' organization would be interested in listening to a broadcast on current public health bills before their state legislature, if this were the subject of their next meeting. Members of mothers' clubs are always interested in securing recent information from authoritative sources on different phases of child care. Many schools are equipped with radios which could be used at pre-arranged times to pick up broadcasts whose special purpose was the presentation of a health message for children.

The 7 instructional health programs mentioned above were reported as being heard 274 times per 1,000 questionnaires from Malden but only 200 times per 1,000 for Arlington. In Arlington, 8.2 per cent, and in Malden, 13.5 per cent of the people reported that they listen regularly to such programs.

TYPES OF BROADCASTS PREFERRED

Plays as a type of health broadcast were preferred by 954 persons or 60.2 per cent of those expressing a preference. A larger proportion of boys and girls preferred this type of broadcast than did men and women. More persons in Arlington than in Malden showed a preference for plays.

"Questions and answers" were preferred by 295 persons, or 18.6 per cent of all groups reporting. A smaller proportion of girls preferred this type of health program than did men, women or boys. A larger percentage of persons in the Malden group preferred "questions and answers" than did those in the Arlington group.

Two hundred and twelve persons (13.4 per cent of those answering) reported a "talk" as their choice in radio health programs. This choice was given by 28.5 per cent of the men; 20.1 per cent of the women; 12.7 per cent of the boys; and 4.9 per cent of the girls.

TABLE I

PERCENTAGE OF THE DIFFERENT GROUPS REQUESTING PROGRAMS ON DIFFERENT SUBJECTS

<i>Subject</i>	<i>All Groups (2,143) Per Cent</i>	<i>Men (309) Per Cent</i>	<i>Women (486) Per Cent</i>	<i>Boys (713) Per Cent</i>	<i>Girls (635) Per Cent</i>
The Body	5.8	5.8	5.1	7.7	4.2
Teeth	5.2	4.5	5.8	4.2	6.5
General Health	4.3	6.1	4.8	3.9	3.5
Diseases	4.0	3.4	3.7	4.2	4.1
Food	3.2	2.3	3.3	2.2	4.9
Diet	2.6	2.6	5.8	1.2	1.9
Complexion	2.3	0.3	2.3	0.9	4.7
Exercise	1.6	1.3	0.6	2.7	1.4
Hair	1.0	0.9	0.4	0.7	1.9
Child Care	0.8	0.9	2.9	...	...
All Others	6.3	5.5	7.0	7.5	5.0

More persons in Malden than in Arlington preferred talks (17.4 per cent as compared with 10.5 per cent).

Fewer persons (only 9.9 per cent of those reporting) expressed a choice for dialogues.

THE BEST TIMES OF DAY FOR BROADCASTING

Figure I shows the per cent of adults and the per cent of secondary school pupils who usually listen to the radio at different times of day. This is, of course, an index of the number of people listening to all programs (primarily entertainment programs) at any one time.

HEALTH SUGGESTION FOLLOWED

No one reported following advice given in non-advertising programs, although 109 persons, about 5 per cent of all persons included in the study, reported putting into practice suggestions given by various advertising health broadcasts. These suggestions put into practice included such items as eating cereals, brushing the teeth, going to a dentist, and eating yeast.

SUBJECTS WHICH WERE DESIRED

Thirty different subjects were named upon which men, women, boys, and girls would like broadcasts. Table I shows the 10 subjects which were reported most frequently, together with the per cent of the total group, and the per cent of the total number of men, women, boys, and girls who were interested in hearing broadcasts on these subjects.

Seven hundred and twelve persons (33 per cent of the total number answering the questionnaire) reported that they would like to hear radio health broadcasts. Of these, 339 were from Arlington and 373 from Malden. These totals represent 41 per cent of the total group from Malden and 28 per cent of the total group from Arlington.

METHODS OF SECURING ADVANCE INFORMATION

Advance information for radio health programs was obtained in the great majority (85 per cent) of the cases reporting, from the newspaper. Other sources of information were the radio (4 per cent of those reporting) and friends (7 per cent of those reporting). Still others (the remaining 4 per cent) tuned in by chance.

BEST STRAIGHT HEALTH BROADCASTS

An appreciable number of people (317) listed the best health broadcast each had ever heard. Those broadcasts reported the most number of times were in the order mentioned, (1) Tower Health Exercises of the Metropolitan Life Insurance Company (105 times), (2) Health Talks for Horlick's Malted Milk (68 times), (3) Health Talks for Stanco, Inc. (59 times), (4) Talks on health for the Parker Dental System (19 times), (5) Massachusetts Department of Public Health (17 times), (6) Talks on Child Training and Mental Health for the Cream of Wheat Corporation (13 times), (7) Talks on Health and Disease for Sharpe and Dohme (11 times), (8) Talks on Health sponsored by the National Broadcasting Company (8 times), and (9) all others (17 times).

SUMMARY

Data collected by means of questionnaires filled in by 2,143 secondary school pupils and adults in two Massachusetts communities, nearly all of whom owned radios, showed that food, toothpaste, and medicine, in the order named, were the products most frequently heard advertised over the radio for their health value.

Instructional health broadcasts were reported 256 times per 1,000 questionnaires returned from Malden, and 217 times per 1,000 questionnaires returned from Arlington.

Plays, questions and answers, talks, and dialogues, in the order named, were reported as being the types of health broadcasts preferred.

The best time of day for broadcasting is between 6:30 and 11:00 in the evening, reaching a peak between 8:00 and 8:15.

No one reported following suggestions given in non-advertising programs, but about 5 per cent of the total group said they put into practice suggestions given in advertising health broadcasts.

About one-third of the people would like to hear broadcasts on health subjects.

More people were interested in radio health programs and greater discrimination was shown as to what constitutes a health broadcast in the city with the well organized health education program in the schools.

It would appear that not more than 1 person out of 1,000 listened to State Health Department broadcasts.

CONCLUSIONS

1. Health education in schools increases the

interest of the population in popular health instruction and increases their discrimination as to the quality of health programs.

2. It might be worth while for health departments to arrange broadcasts for particular audiences (women's clubs, civic groups, secondary schools) on topics which these groups are considering.

3. A half-minute message introduced between other programs might also serve to announce health department publications, or to offer a terse bit of timely health advice.

4. It seems apparent that dramatization is the most acceptable form of health broadcast.

5. The general lack of discrimination as to the reliability or unreliability of broadcast health advice shows the need for controlling health broadcasting and for instruction concerning pernicious advertising.

6. Our experience with the present study suggests that better results could be obtained by securing exact information concerning a particular typical day.

REFERENCES

1. *A.J.P.H.*, 22, 2:220 (Feb.), 1932.
2. *A.J.P.H.*, 22, 9:881 (Aug.), 1932.
3. *A.J.P.H.*, 21, 9:1069-1070 (Sept.), 1931.
4. Koon, Clive M. *Broadcasting by National Voluntary Organizations with Public Service Objectives*, Office of Education, U. S. Dept. of the Interior, Washington, D. C., 1933.
5. Tyler, Tracy F. *Radio Activities of State Departments of Education*. The National Committee on Education by Radio, Washington, D. C., Feb. 1, 1933.

Babies Huskier Now

BABIES born in New York State today have a far better chance of surviving the first year of life than did those born 25 years ago, according to the 1933 annual report of the Division of Vital Statistics. Infant mortality in the state has been declining not only in terms of the number of births but also

in relation to all deaths. Twenty-five years ago, out of 100 deaths of all ages, 19 were of infants under 1 year of age; in 1933 the proportion dropped to 7. In other words, the rate of infant deaths has declined considerably faster than the general death rate.—*New York State J. Med.* 35, 3:116 (Feb.), 1935.

Use of Convalescent Measles Serum to Control Measles in a Preparatory School

J. ROSWELL GALLAGHER, M.D.

School Physician, The Hill School, Pottstown, Pa.

THE suppression of a threatened outbreak of measles in a preparatory school is of importance because of the loss of school days and the inconvenience which may result; neither the incidence of complications nor the attendant seriousness of this disease is as important a factor among the members of this age group as in younger children, but the disease spreads with extreme ease and attempts to control it by the isolation of contacts are relatively futile. The inconvenience which an outbreak of measles may cause and the extent to which it may spread, even when a group is under careful medical supervision, are illustrated in Table I; such experiences have been duplicated frequently among other groups of preparatory school boys.

Since 1918 when Nicolle and Conseil⁴ advocated the use of convalescent measles serum as a prophylactic agent it has been frequently used in attempts to control measles, particularly in institutions housing young children. Zingher and Park,⁸ Park and Freeman,⁵ and many others have reported very satisfactory results from its use; however, because convalescent serum is somewhat difficult to obtain, another effective agent has been sought by various investigators. Tunncliffe and Hoyne⁷ and Peterman⁶ have reported success with a serum produced in goats which had been inoculated with a diplo-

coccus isolated from patients suffering from measles; other workers¹ have noted no preventive action with that serum. It is now generally agreed that measles is caused by a filtrable virus and that the coccus described by Tunncliffe is a secondary invader. The ease with which parental whole blood may be obtained and the satisfactory results reported by many workers since the introduction of this method by Degkwitz³ have made it the most common method of prophylaxis in use at the present time; usually 15 c.c. of whole citrated blood obtained from a parent is injected into each buttock of the child.¹

In attempting to suppress an outbreak in a preparatory school, however, the use of convalescent serum remains the most practical procedure. Park⁵ believes that the immunity conferred by this serum will persist for from 2 to 4 weeks, and that in those individuals who develop attenuated cases a permanent immunity will nevertheless be produced. Zingher⁸ has pointed out that the infectivity during the prodromal stage is distinctly less in an individual who subsequently develops an attenuated case rather than an unmodified one. The majority of previous reports have dealt with results obtained in children of 3 years of age or less, and the dose which should be given the average

adolescent can only be judged approximately. Park⁵ has advocated the use of 6 c.c. of serum for children less than 3 years of age, and 10 c.c. for those 3 years of age or older. Debre² suggests a minimum dose of 3 c.c. for infants and would add 0.5 c.c. for each additional 6 months of age, up to a maximum dose of 15 c.c. at 15 years. The serum should be administered before the 5th day of the incubation period; the earlier the serum is given the better is the possibility that the disease will be prevented rather than attenuated. Serum should be obtained from a convalescent individual between the 10th and 40th day following the return of his temperature to normal; a preservative should be added if the serum is not used within a few days.⁵

The present paper reports our experience with the use of convalescent serum in an attempt to control a threatened outbreak of measles in a boys' preparatory school during the winter of 1934.

Table I shows the incidence of measles together with the number of Infirmary days involved during outbreaks at a preparatory school in 1926 and 1929. No convalescent serum was used.

METHOD AND RESULTS

On January 1, 1934, C.Y. was exposed to an individual who developed measles on the following day. Upon his return to school he was quarantined, and on January 12 his prodromal symptoms began; the rash appeared on January 16. F.L. and R.D. were pa-

<i>Date of Onset</i> 1926	<i>Number</i> <i>of</i> <i>Cases</i>	<i>Date of Onset</i> 1929	<i>Number</i> <i>of</i> <i>Cases</i>
April 17	1	February 7... 1	
April 28	2	February 11.. 1	
April 30	1	February 12.. 1	
May 3	1	February 18.. 3	
May 4	2	February 19.. 2	
May 5	1	February 20.. 1	
May 7	1	February 21.. 1	
May 9	2	February 23.. 2	
May 14	1	February 25.. 2	
May 19	1	February 27.. 1	
May 20	2	March 2..... 2	
May 22	1	March 4..... 3	
May 25	1	March 6..... 1	
May 26	1		
May 29	1	Total	21
May 31	1		
June 8	1		
Total	21		

	1926	1929
Total Number of Cases.....	21	21
Total Number of Infirmary Days..	251	244

tients in the same infirmary from January 4 to 14 and January 15 to 16 respectively. On January 27, F.L. was re-admitted to the infirmary, and on January 28 his rash appeared; R.D. was re-admitted on January 28, and his rash appeared on January 30. In Table II data concerning these 3 cases are presented.

Table II gives data concerning the cases which might have initiated an outbreak of measles. At the development of cases F.L. and R.D., and because of the failure to quarantine them during

TABLE II
CASES WHICH MIGHT HAVE INITIATED AN OUTBREAK OF MEASLES

<i>Case</i>	<i>Date of Onset of</i> <i>Prodromal Symptoms</i>	<i>Date of Appearance</i> <i>of Rash</i>	<i>Date of</i> <i>Hospitalization</i>
C.Y.	January 12	January 16	January 7
F.L.	January 24	January 28	January 27
R.D.	January 26.	January 30	January 28

TABLE III

BOYS RECEIVING SERA CY AND NYC AND CASES DEVELOPING

	<i>Group I</i>	<i>Group II</i>	<i>Group III</i>	<i>Total</i>
Serum given	10 c.c.	8 c.c.	5 c.c.	
Number which received serum CY	8	11	9	28
Number which received serum NYC	11	16	10	37
Number which developed measles	3*	0	0	3

* Each of these individuals developed an attenuated case; in each instance serum NYC had been given.

the entire prodromal period, it seemed likely that many other cases would develop subsequently. Investigation showed that 66 of the 330 boys in the school had not had measles; their ages ranged from 12 to 20 years. These boys were divided into three groups, graded as to the likelihood of their having been exposed; group I included boys known to have been in contact with F.L. or R.D.; group II consisted of the boys who probably had been exposed; and group III included older boys whose chance of contact was somewhat more remote. The likelihood of contact was based upon seating arrangements in chapel, dining hall, and classrooms, dormitory arrangement, athletic contacts, etc. Such a division became necessary because of the limited amount of serum available, and provided a means of adjusting the dose in relation to possibility of infection.

On January 30 convalescent serum obtained either from C.Y. on the 10th day after his temperature had become normal, or from the Bureau of Laboratories of the City of New York, was given to 62 of the 66 boys in the school who had not had measles; 1 of the remaining boys received the serum on February 2 and 2 others on February 3; 1 boy did not receive serum. The names of the boys in each group were arranged alphabetically and these two sera were assigned alternately; because the supply of serum NYC was greater a somewhat larger number received that serum. Since the prodromal symptoms appeared in F.L. on January 24 and

since R.D. was hospitalized on January 28, it is obvious that serum was given to 62 boys at an interval of from 2 to 6 days following possible exposure. The serum was injected into the upper outer quadrant of the buttock. In Table III will be seen the number of boys who received each dose of either serum, together with the total number of boys who subsequently developed measles.

COMMENT

In an institution in which there were 66 adolescents who were probably susceptible to measles, convalescent measles serum was used as a prophylactic agent following the appearance of 3 cases of measles in the student body. In such a group, if one is to judge by past experience, at least 25 per cent would probably develop measles before the subsidence of the outbreak. Following the prophylactic therapy, however, only 3 cases of measles developed in this group and each of these cases was in striking contrast in severity to the original cases; in Tables IV and V we have tabulated certain clinical data which will indicate the differences between the unmodified and the attenuated cases.

Despite the fact that no untreated control group was employed in this study, we feel, on the basis of past experience, that the subsidence of this outbreak was due to the use of the convalescent serum; it is unlikely that anyone who has dealt with measles in a similar situation will believe otherwise. The question of proper dosage in

TABLE IV

CLINICAL DATA CONCERNING THE 3 CASES OF MEASLES WHICH MIGHT HAVE INITIATED THE OUTBREAK

Name	Date Rash Appeared	Infirm- ary Days*	Duration of Fever (Days)*		Koplik Spots	Rash	Coryza	Conjunc- tivitis	Bran- chitis	Phato- phobia	Ma- laise	Course
C.Y.	Jan. 16	19	3½	+++	+++	+++	+++	+++	+++	+++	+++	Severe
F.L.	Jan. 28	11†	2	++	+++	+++	+++	+++	++	+++	+++	Moderate
R.D.	Jan. 30	16	2½	++	+++	+++	+++	+++	+	+++	+++	Moderate

* Exclusive of prodromal period

† Acute appendicitis and appendectomy on 12th day

TABLE V

CLINICAL DATA CONCERNING THE 3 CASES OF MEASLES DEVELOPING IN THOSE INDIVIDUALS WHO HAD RECEIVED PROPHYLACTIC DOSES OF CONVALESCENT MEASLES SERUM

Name	Date Rash Appeared	Infirm- ary Days*	Duration of Fever (Days)*		Koplik Spots	Rash	Coryza	Conjunc- tivitis	Bran- chitis	Phato- phobia	Ma- laise	Course
J.P.	Feb. 10	9	1½	+	+	+	+	+	—	+	+	Very mild
C.S.	Feb. 9	10	2	+	+	+	+	±	—	—	±	Very mild
W.H.	Feb. 21	12	2½	+	++	+	+	+	—	++	++	Mild

* Exclusive of prodromal period

this age group is difficult to determine accurately. The development of attenuated cases in J.P. and C.S. despite the fact that prophylaxis must have been given them at most within 72 hours following exposure, suggests that they were particularly susceptible. It may be that a larger dose would have prevented these cases, but if one were to judge by this single experience, a dose of 10 c.c. will produce satisfactory results in the vast majority of instances. It is interesting that each of the 3 individuals developing attenuated measles had had serum NYC; it is not unlikely that this serum had a lower antibody content than serum CY which was only 24 hours old.

SUMMARY

1. In a threatened outbreak of measles in a group of preparatory school boys, 66 of whom had not had measles, convalescent measles serum was used prophylactically. Only 3 cases of measles, all decidedly attenuated, subsequently developed in this group. On

the basis of past experience, at least 25 per cent of this group might have been expected to develop measles.

2. The use of convalescent measles serum is suggested as the most practical method of controlling an outbreak of measles among adolescents in a preparatory school or in a similar situation. A dose of 10 c.c. is considered adequate for members of this age group.

REFERENCES

1. Barenberg, L. H., Lewis, J. M., and Messer, W. H. *J.A.M.A.*, 95:4, 1930.
2. Debre, R., and Joannon, P. *La rougeole: épidémiologie, immunologie, prophylaxie*, Paris, Masson et Cie, 1926.
3. Degkwitz, R. *Ztschr. J. Kinderh.*, 27:171, 1920.
4. Nicolle, C., and Conseil, E. *Bull. et mem. Soc. med. d. hop. de Paris*, 42:336, 1918.
5. Park, W. H., and Freeman, R. G. *J.A.M.A.*, 87:556, 1926.
6. Peterman, M. G. *Am. J. Dis. Child.*, 39:294, 1930.
7. Tunnick, R., and Hoyne, A. L. *J.A.M.A.*, 87:2139, 1926.
8. Zingher, A. *J.A.M.A.*, 82:1180, 1924.

NOTE—The author wishes to express his sincere appreciation of the coöperation of Dr. W. H. Park who, through the Bureau of Laboratories of the Department of Health of the City of New York, furnished part of the convalescent measles serum in this study.

Sanitation of Mountain Playgrounds With Respect to Contamination of Streams*

C. G. GILLESPIE, F.A.P.H.A.

*Chief, Bureau of Sanitary Engineering, State Department of Public Health,
Berkeley, Calif.*

CALIFORNIA with its 50,000,000 acres of high mountains over 2,500 feet elevation, and 1,000 miles of ocean coast, is a paradise for the lover of the out-of-doors. As soon as schools close in the early summer, travel starts for seashore and mountain, reaches its peak on the Fourth of July, and as suddenly ends on Labor Day. In that 60 day period the highways that now penetrate the mountain canyons hum with autos of between 300,000 and 500,000 people. The great majority of vacationists congregate in established public camps and cabin tracts, numbering well over 1,000 and occupying approximately 1,000 miles on about 100 streams. Near the large cities of the South, 5,000 people may travel up the ordinary canyon on hot week-ends. In one canyon the record is 30,000. In winter, snow sports also draw huge week-end crowds to at least 3 of the mountain camp-grounds, thus making a year-round problem.

Though a few camps are located on mountain sides or ridges for vista views, most campers stay near the streams, partly for the convenience of water supply, but also because in the semi-

arid West running water is so much a rarity that the sight of it in the green mountains satisfies the soul. Perhaps this preciousness of water explains why the people have responded so readily to programs for keeping the streams and mountains clean.

Up to about 1915, mountain recreation was primitive in character and reserved for the true nature lover. Roads into the mountains were mere wagon trails, so steep, narrow and tortuous that only venturesome spirits undertook them, and one had the whole out-of-doors to choose from for a stopping place.

With the close of the World War conditions changed. Increased ownership of autos caused the fine highways of the valleys to be pushed farther into the mountains, and presently city people scattered to them. At first there was no restriction or restraint. The army of tenderfoot campers flitting here and there soon desecrated the mountains with papers, cans, and garbage.

It was fortunate, however, that nearly all the popular areas fell in the 19,000,000 acres of California National Forest, and therefore were under U. S. Forest Service with its fine body of rangers, commanding the respect and admiration of the public.

A program decided on by them with

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

the health authorities to change the dangerous habits of the campers embraced in essence, sanitary placarding of roadsides and camp sites; closing large areas to the public on the grounds of fire protection; the requirement that campers hold campfire permits issued by the Rangers; and concentrating the crowds in properly equipped camp areas.

Of the placards, the most useful read:

"Leave your camp as you would like to find it. Burn or bury all refuse. Keep the pleasure grounds of America clean.

California State Board of Health "

"Pollution of Streams is Unlawful

Violation of the *State Sanitation Laws* is a misdemeanor punishable by *Fine* or *Imprisonment*. Within the National Forests the United States Forest Service aids the State in the enforcement of these laws.

All persons on the National Forests are warned to *Commit No Nuisance* whereby a stream may be defiled. *Burn* or *Bury* all camp refuse. Keep your own camp clean and report all violations of the laws to the Forest Ranger.

California State Board of Health
United States Forest Service "

"DANGER

DO NOT DRINK THIS WATER WITHOUT
BOILING IT.

California State Board of Health "

The last sign was posted along streams that had become contaminated. It probably brought home to the campers the ruination they were committing.

Concentrating the campers in fewer places made the handling of the sanitary problem and fires economical, and in fact possible. It has been a fixed policy of the Forest Service to establish more and more of these public camp grounds at favored spots. There are now close to 500 of them in the 18 Forests comprising California.

There are, however, still about 1,500,000 acres in the higher mountains, reached only by trail, that are reserved

for primitive recreation. Here the true camper and nature lover sports as in the past, but the great crowds throng to the public camps. With each season the code of the mountains gains converts. The sanitary program has become remarkably successful. The Forest Service Officials tried putting a tactful and persuasive patrolman in several of its heavily used public camp grounds, in lieu of many maintenance crews to clean up after parties had left. His task was to go from camp to camp, putting in a word for leaving the place clean and keeping the streams pure. It was found that fewer men were needed for the clean-ups than formerly were required.

Next in point of acreage and use are the intensively used National Parks under the Department of Interior. These aggregate some 1,200,000 acres and are located in Yosemite, Sequoia, Lassen, and Grant National Forest. In addition, the Department of the Interior has a number of smaller National Monuments, where there is more or less picnicking. There are also a number of comparatively small but intensively used state parks, acquired in the past few years by the State Division of Parks.

There are about 6,000,000 acres of mountain lands in private ownership, and several thousand have recreational attraction. Here the problem of sanitation falls entirely on the health officer.

The setting aside of the public lands in the National Forests 30 to 50 years ago was purely to conserve water and timber. In the mountains just behind our present meeting place is the First National Forest created in California, the San Gabriel Timberland Reserve, proclaimed by President Harrison to conserve water, on December 20, 1892. However, until the President's Conference of 1920 on outdoor recreation and recreational resources of federal lands, the Forest Service shut its eyes

to recreation. That was the turning point. By 1931 recreation was on a plane as important as forest conservation, and the wilder and more scenic portions of canyon and mountain have been set aside for recreation.

The slogan is "The Greatest Good for the Greatest Number." In the South, watershed, stream protection, and recreation come first. The principle is guiding, even into the detailed use of a recreational area. Thus priority of use is given to public camps, municipal camps, charitable organizations, schools, stores, and cabins, in substantially that order.

The use of the National Forests for summer cabins began in a small way along about 1910, when individuals secured permission to use small plots of ground for that purpose. With the swell of travel into the mountains after the war, there came a great demand for these cabin sites. To reduce the fire hazard, the Forest Service became a subdivider and set aside tracts which it has surveyed into plots of approximately $\frac{1}{2}$ acre each.

These lots are leased under "Special Use Permits," at a charge of \$15 to \$40 a year, depending on the use and the term of the permit. There are now over 6,000 permittees. Each permittee does all his own building, and associations do more or less of the development work. The tendency is to put permits on a yearly term and to get away from commercial permits. Furthermore, the Forest Service is more particular to go into the experience and finances of the permittees, to avoid "shoestring" enterprises.

Apparently it was never anticipated that this cabin development in the mountains would assume large proportions or create a sanitary menace. Even now setback requirements from streams and roads are not specified, though the permits specify a 10 foot setback from exterior boundaries of the lot so as to

avoid congestion. Sanitary programs for the protection of streams have been very much handicapped on this account. Often the cabins will be found at the water's edge.

The permits are terminable, and termination is not contestable. However, the Forest Service aims to terminate them only for good cause or violation of the numerous conditions contained in the permits. Certain of the sections specify the minimum cost of the cabin, usually \$500; others regulate garbage disposal and latrines, and require all possible precautions to prevent pollution of waters in the tract. Because camp grounds are being increased and they clash with the cabin sites, and because eastern congressmen and the public look askance at "Special Use Permits," it seems cabin and commercial use will decline.

The cabin and commercial problem of the future is more apt to be found on the privately owned lands within or adjacent to the National Forests. In San Bernardino County mountains alone, it is understood there are some 9,000 cabins on private lands as against 3,000 on Forest Service land.

One finds wide extremes in the conveniences provided in the different mountain recreation areas. As a rule the National and State Parks, all of which happen to be in the northern or central part of the state, are the best equipped, having water under pressure in cabins and camp, camp garbage collection and water flushed sewerage except where outlying camps may use some other methods, usually chemical toilets.

Sanitary requirements vary widely in the National Forest, as each district has its own supervisor with much local authority. Those near the large cities in the South are generally the best equipped, while Forests farther away are primitive.

In the best developed camps and

cabin tracts in the National Forests, piped water is brought to convenient places. But generally water must be carried from its source, which, in the northern and central portions of the state, is a natural spring or side creek, and in the South is generally the main stream through the camp. A common device in the camp is to dig a small hole along the stream and dip water from it.

Since showers are almost unknown, and water-flushed toilets are usually restricted or not allowed, water requirements are not much over 5 gallons per head per day.

In order to control water resources for future development, the Forest Service now files on all water it can get, and holds to land leading to water-bearing ground. Associations of cabin owners are encouraged by the Service, to help put over programs for piping the water. At one time the Service encouraged the Associations to do their own filing, but this is now regarded as unwise.

Garbage disposal is well done. It is rare now to find cans and refuse along the streams and camp grounds. Cabin owners and primitive camps bury the garbage and feed the edible portion to the "birds and bears." A few of the better equipped camps are provided with garbage cans and garbage is collected by the Forest Rangers. The Rangers find, however, that it is almost impossible to have enough cans to take care of heavy week-end crowds, and people will drop their refuse on the ground. The majority of the camps have large garbage pits, which are provided with tight board covers and periscope inlets. When a pit fills up it is abandoned and a new pit is dug.

The point of the title of this paper relates to the disposal of refuse and human excreta and the effect on mountain streams. Next to fire prevention, protection of streams is probably the highest requirement that has been set.

Not only do the streams in the regions that are popular with the public suggest by their pristine clearness a purity that should be preserved, but they are all used for irrigation and town purposes by some 3,000,000 people. Probably 500,000 people receive the water inside of 10 to 20 miles of flow from recreation areas. Even closer at hand the streams are many times the water supply of the vacationists themselves.

Canyons are narrow and sides are precipitous, so that space for sewage disposal is at a premium. Cabins are often close to streams or perched on hillsides.

Soil conditions do not vary as much as one might suppose. The prevailing types are fine-grained, loose and ashy, or more or less coarse decomposed granite. The latter is found mainly in canyon bottoms. If not too cemented it makes an excellent medium to absorb sewage. Bedrock is of course variable in depth and fissuring, but is generally shallow, and the soil may be interlaid with huge boulders. Depth to subterranean water is also variable. In meadow spots the ground may be springy or waterlogged at certain seasons, and of course cesspools, or almost all sewerage devices, are dangerous. In one such area chemical toilets are required and contents must be hauled away.

Leaving out Yosemite Park, Arrowhead Lake, and a couple of small parks, there are no sewer systems and no streams of sewage to be thought of. Under such circumstances, Forest Rangers and health officers go to extremes to preserve the streams safe enough to drink. In the South, evidently simply through fear of underground pollution, wated flushed toilets have not been allowed in the canyons belonging to the Forest Service, and one district does not allow them anywhere on its lands for fear of water-shed pollution. In one of the counties they are

forbidden by ordinance, if disposal is less than 100 feet from any stream, spring, or vein of water, but may be installed under permit for the next 400 feet. In these areas swimming in streams is also forbidden.

Elsewhere in the National Forests the Rangers allow a good deal of latitude in particular cases where it is felt there is no danger to streams. So far as possible, local health officers try to hold private lands to the same restrictions as prevail on adjacent National Forests, but they can go only so far as the law allows in refusing the right to a water flushed system in the absence of actual menace. The public resorts frequently have water flushed systems. Kitchen slops and lavatory water are run into cesspools or scattered on the ground, and appear to create no problem.

In place of water flushed systems, dry vault privies or chemical toilets are accepted or even required. One of the National Forests has devised a unique vault privy, using an upright elliptical can support for the seat, and an ingenious cross-flue at the head of the upright vent better to utilize natural draft and improve ventilation. It is said to remove practically all odors.

Chemical toilets are reported as not measuring up to expectations, but those who advocate them contend that they are still the best method of disposal of dry excreta, and that they require the least supervision, and of course no water. The principal difficulty is that they require more attention than can be reasonably expected, to accomplish the theoretically perfect results claimed for them. In heavily used camps the container soon fills and a nasty juice leaks out on the ground. The cesspools to receive cleanings have received woefully inadequate care as to location and operating conditions. Some people complain bitterly of odors from the bowls and use them only under compulsion.

What the future holds for sewage disposal methods in the mountains is a question. It is expected that people will want their water flushed fixtures in their vacation places. This means more liberal water supply and undoubtedly a higher degree of supervision of operation than at present, greater care in the location of camps and cabins and of the sewage disposal, and utilization of all safeguards against stream pollution.

Sanitary supervision is now extremely meager and non-technical in the mountains, considering the populations and interests involved. The best is probably to be found in the National Parks where the Public Health Service gives engineering supervision in policies, design and operation. The National Forests must depend on state and local health authorities and on its Rangers. The Forest Ranger aims to give each cabin an examination for fire-proofing, garbage disposal, and condition of toilets, before June 1, and again at the close of the season, to decide on any changes necessary before the next year. During the rush season there is little time for inspection except on receipt of complaints.

The state and local health departments are not even able to do as much inspection as the Rangers. In this respect Los Angeles County fares best. It has the most complete local health service, and the county building department checks plans for cabins and buildings. Also in the canyons used for water supply of Pasadena, a coöperative arrangement between the city and county health departments has recently provided a special inspector. He has made a systematic survey to map premises, and has taken occasional samples of creeks and wells. Comparing National Forests, North and South, the latter have many more full-time health departments to draw upon. All commercial auto camps are under the State Immigration and Housing

TABULAR COMPARISON OF *B. Coli* ANALYSES OF STREAMS IN MOUNTAIN RECREATION AREAS

	Range of <i>B. coli</i> per c.c.						
	0-0.5		0.5-1.0		1.0-2.5		Over 2.5
	24 Hr.	48 Hr.	24 Hr.	48 Hr.	24 Hr.	48 Hr.	
A—Highly Protected Streams (No water flushed systems and no swimming allowed) . .	50	45	0	0	1	8	0
B—Less Highly Protected Streams (Leaching methods of sewage disposal, and swimming al- lowed)	48	41	0	0	3	10	0

Commission which makes occasional inspection for general sanitation as well as housing.

Considering the fact that the whole sanitary program revolves around keeping the streams clean, it is strange that so little time is spent on noting and studying the performance of leaching methods of disposal in the few places where they are used, and that practically no analytical work, and none that is systematic, has been done to determine the actual state of purity of the streams. The most convincing evidence of which I am aware is from the brief but systematic sampling by this Bureau in the summers of 1930, 1932, and 1933, of 20 mountain streams popular with vacationists, in which 102 samples were taken. By accident, half the streams and practically half the

samples were taken from streams in the highly protected National Forests in the South and along the southeast slope of the Sierras. The others were in the somewhat larger streams of the Sierras from Bakersfield to Placerville, where leaching methods of sewage disposal, and swimming are not objected to *per se*.

A comparison of the results shows that there is substantially no difference in the cleanliness of the two sets of streams, nor do the analyses by streams show any significant difference one from another. Even the few somewhat higher values probably signify merely poor sampling, as a high result did not carry to lower sampling points. Indications are that the higher results signify *B. aerogenes*. It is doubtful if at any place the water was really at a "danger point" for drinking.

Public Health Education Technics of Special Experiences*

Newspapers

WILLIAM FORD HIGBY, F.A.P.H.A.

Secretary, California Tuberculosis Association, San Francisco, Calif.

DURING the last half century the format and character of the American newspaper has completely changed. Personal journalism has passed. The newspaper, even in a city of 20,000, is a highly capitalized industry.

There was a time when any person filled with enthusiasm could start a newspaper with a capital of a thousand dollars. Today a metropolitan paper is worth millions. In the days of personal journalism, newspapers were financed by their subscribers; today they are financed by their advertisers, and depend upon advertising for their existence.

Frequently we hear the railings of the uninformed against the policy of newspapers. They say: "Newspapers stress arson, rape, and murder. They pump up the filth from the sewers of the world and dump it on their front pages. They should print educational matter, the things people should read, the things that would make a better world in which to live."

In every city of any size such papers have been started and have perished because they could not get the circulation to get the ads to pay for the cir-

culation to bring sweetness and light into the American home.

Before there were any educational psychologists the editors of our daily press caught that intangible moving mood of the American people and printed what the people wanted to read.

In San Francisco a hot 8 column line will increase street sales by 10,000. Consistent failure to make the front page play that will capture the interest of the people, will cost circulation, and circulation is the life blood of a paper. The play of the news reflects the desires of a given population. We may resent the charge but the facts remain.

Banner lines, heads, sub-heads and picture captions have deservedly received adverse criticism from our sensitive health administrators as well as others occupying for a brief moment the spotlight in the daily parade.

But there are mechanical and verbal difficulties interposed between a good story and its head. Some day, when you have finished what you think is a particularly brilliant speech or paper, try to describe all you have said in 3 lines of 12 letters, and spaces in each—no more, no less—and include a verb that ties it together perfectly. The wonder is that headlines reflect so well the contents of stories. It is readily apparent why it is that a good copy desk man can solve a cross-word puzzle as fast as he can write, and why 90

* Read before the Public Health Education Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

per cent of all such puzzles, during the height of the craze, were dashed off by these men while they were waiting for copy.

Factors other than mechanical difficulties stand between the head lines and the story. Scientific men seldom commit themselves to definite statements. Like lawyers, they always have a trap door from which they can crawl and file a new brief. News can be stated in categorical affirmatives, and whether they like it or not, it will be so stated.

Once an epidemiologist was interviewed on the efficiency of health work in rural counties. Every sentence was carefully qualified, but he was unquestionably pointing out weaknesses in the health work of his state. After eagerly awaiting the appearance of the paper, he was mortified to read:

RURAL HEALTH
CHIEFS SHOWN
FLAT FAILURE

Health authority shows peril to citizens who pay taxes for health protection.

When you use the newspaper to send out health information, you must remember you are using a rifle and not a shot gun. You must use a sharp nosed bullet fired with high powered ammunition and aimed with telescopic sights at a specific target. You must learn to hit the bull's-eye. Unlike the marksman on the rifle range, it is difficult to determine how accurate the shots are.

A press clipping bureau is only the record of the ammunition used. It is no indication of the accuracy of the shot fired; it simply shows that the copy has passed the editor and in his judgment may hit the target, but a published story is by no means an indication that you have made a bull's-eye. Publicity directors, I know, will pardon me for betraying a trade secret.

Too many of us write copy as we prepare circular letters. If we want

our material to get the best chance possible in the competition of the news of the world, I suggest that all copy be prepared as either exclusive or unduplicated for all papers. Most of us prepare a story, mimeograph it, and send it to all the papers of our city, county, or state. This method brings results, but experience has proved that greater results can be produced if each paper is treated as an individual.

Newspapers vary with the community, and as between city and county, as do mercantile establishments. In the leading city of a rural county you will find the newspaper corresponding to the general store, where the proprietor and his clerks sell everything from a spool of thread to a tractor. In the metropolis you will find the newspaper which corresponds to the department store where lingerie for young ladies up to 14 years is sold on the fifth floor, and for those above that age, on the first floor. In hundreds of communities where the only evidence of gregarious life is a wide place in the road, we have the Weekly, unquestionably the most influential paper of them all.

In the large communities we have a further obstacle to general copy, the evening paper and the morning paper. This difference is often overlooked. We might liken the evening paper to the emergency hospital, where the patient is rushed for first aid, and the morning paper to the general hospital where there is time for proper diagnosis and treatment. As many people die in the emergency hospital, so many stories die in the evening paper. The evening paper is a flash, the morning paper a controlled flame. Complicating the task of the copy writer is the foreign language press, district papers, and class publications.

Avenues for health information are open in metropolitan papers to carefully prepared copy in Sunday and special editions, newspaper magazine sections,

rotogravure, and illustrated feature pages, in book review pages, and in the auto and sports and society sections.

A good picture will carry a poor story. Learn to use a camera and always have it with you. Cultivate young amateurs who are clever at taking pictures. Frequently, the posed picture is a flop. Generally speaking the picture of either a malnourished health official with a bald head, or a fat one with flat feet, is not the best method of promoting, by graphic art, the principles of health education. These pictures are appropriate only in the de luxe annual report, printed at the expense of the tax payer.

There are no rules about newspaper art which I have the temerity to outline before a scientific gathering. One rule only will I give. Clip all the 2, 3 and 4 column art in a given paper for a week. Analyze their appeal and if you wish to take a postgraduate course, study Freud.

Many standard texts are available which give the mechanics of preparing copy. Mechanical structure of newspaper copy must be fully understood. It must not be neglected, but given a sound background, there is no guarantee of success any more than a brilliant career is assured the graduate of an art school who has mastered form, color, and the technic of mixing paints.

Copy must have a punch. As the reader quickly passes his eye over the pages of his paper, the lead of your story must signal his brain to stop, look, read. When your copy reaches print you have entered a contest for a prize—the attention of the reader. It is a contest between champions, and 5 minutes after tossing aside the paper only the winners are remembered. The field is forgotten. Someone has said, "Nothing is as dead as yesterday's paper."

We are discussing, this afternoon, the various avenues open for the dissemina-

tion of health education. We must never forget the limitations of each of our media. Devise ways to use every one of these avenues systematically; do not make the mistake of thinking that the newspaper is your only medium or that all messages can be given through its columns. The newspaper should be the mirror which reflects your public relations campaign. A newspaper story must be news, and news is something that has just happened or is about to happen. The life span of a news story is very brief. Many of us try to make octogenarians of something whose life span does not exceed 6 hours.

No editor ever turns down a good news story, but he prints your propaganda with a frown on his face and a curse in his heart. It is his way of trying to be a good fellow, but he loses respect for you.

We have given one rule for the preparation of copy—it must have what the editors call punch. The only other rule we shall give is that it must be short. If a man is drowning he cries, "Help!" That is all that is necessary.

Julius Caesar would have been a great newspaper man had he lived today. In describing his Gallic campaign he wrote: "Veni, Vidi, Vici." It took the Victorian historians 6 volumes to describe the same campaign. A reporter once sent by his city editor to cover an address, returned flushed with enthusiasm: "Hot stuff, worth a column." The city editor held up his thumb and index finger about an inch apart and said: "Fifty words." The reporter bubbling over started to protest. He was rudely interrupted by the editor who said, "Kid, the biggest story that ever broke in the history of the world was the Crucifixion of Jesus Christ, and John reported it in 350 words."

We said before that unduplicated and exclusive copy produced the best results; of course, it takes more labor,

time, and thought, but if we are looking for efficiency, it is worth the effort. We have attempted to show that newspapers of the same class have different personalities, and that there are many differences between different types of papers and departments of the same paper.

Copy should be written with these interests, differences, and prejudices in mind.

A good newspaper man can hang up his hat in any shop in the country and in a few days get the feel of the paper,

instinctively grasp the S.O.B. list and identify himself like a chameleon with his surroundings.

The copywriter of health information should so identify himself with the intangible personality which is represented by the paper for which he is writing, that when his name appears on the upper left hand corner of the copy, the editor knows he need go no further but in the rush of the day can shoot the story to the copy desk without re-write or slash. In other words, he accepts you as a member of his staff.

Local Boy Makes Good in a Big Way

THIS traditional headline of the country paper seems to apply to a son of up-state New York. He is Dr. Sylvester Maxwell Lambert, of Ellen-ville, who now has a practice of some 1,000,000 patients in 8,000,000 square miles of sea and land in the Pacific Ocean. As related in the *American Magazine*, he is director of the medical work of the Rockefeller Foundation in the islands of the Pacific Ocean—a roving commission with a variety of duties. Treatment, by internal medicine and injections, of hookworm and yaws, two of the worst scourges of the tropics, comes first. Then he teaches the principles of hygiene and sanitation to the natives and assists the various island governments to coördinate their medical departments into one service.

Dr. Lambert reports that the natives of the Pacific islands, formerly reported dying out, are now increasing. He said to John W. Vandercook, writer of the article:

Hookworm happens to be easily curable.

It didn't used to be. In 1921 Dr. Maurice C. Hall, zoölogist of the Bureau of Animal Industry of the U. S. Department of Agriculture, found that a small dose of carbon tetrachloride, one of the cheapest, simplest things on earth (dry cleaners use it instead of gasoline), would clean out, at once, 90 per cent of a patient's hookworm parasites.

Having something like that to peddle, believe me, makes travel easy. The work of the Foundation and the government—this health business is done on a partnership basis, of course—did more to civilize Malaita, I think, than all the missionaries and punitive expeditions of 50 years.

I suppose you don't care a darn about the Native Medical School! But it's more important than all this stuff put together. It's the first of its kind in the world—a school where natives receive a full course in modern medicine so they can go back and teach their own people. It's located here in Suva.

All the students are Pacific Island natives. Forty students are enrolled. In exchange for their tuition they must serve their own people. It's a tough job we're giving them—to apply modern medicine, in some cases to people just emerging from the Stone Age. But these boys can do it.

New York State J. Med. 35, 2:55 (Jan. 15), 1935.

Virulence Tests for Typhoid Bacilli and Antibody Relationships in Antityphoid Sera*

JOHN F. NORTON, PH.D., F.A.P.H.A., AND JOHN H. DINGLE, Sc.D.

The Upjohn Company, Kalamazoo, Mich.

VARIATION and dissociation in the enteric group of bacteria are accompanied by changes in antigenic properties^{1, 2, 3}; and such changes may, in turn, affect the value of these variants or dissociants for prophylactic purposes. Relative virulence of these organisms also may be associated with dissociation and correlated with antigenic activity.

The lack of sensitive and convenient methods for determination of virulence and of antibody relationships in antisera produced against typhoid bacilli of established virulence has led to the following experimental work. Particular emphasis has been placed on the measurement of protective action of the antisera in an attempt to determine whether there is a correlation of such activity with some known and easily determinable property of the antisera and whether this property may be correlated with antigenic components of the organisms being studied. Methods for determination of virulence of typhoid bacilli and for measurement of protective action of antityphoid sera are presented, together with preliminary data obtained by these methods.

I. VIRULENCE TESTS

In the early work with typhoid bacilli it was found that large numbers of living bacilli would kill the common laboratory animals—mice, guinea pigs, and rabbits—but that strains of the bacillus varied in this respect. Pfeiffer and Kolle⁴ found that freshly isolated strains of typhoid bacilli had a lethal power for guinea pigs 2 to 10 times that of old laboratory strains. Kutscher and Meinicke⁵ obtained one highly virulent culture which killed guinea pigs in a dose of 1/100–1/200 loop.

Goyle⁶ in a study of the normal and rough strains of *Salmonella enteritidis*, found that the normal form was the more virulent for mice, and also that the filtrate of an autolysed culture of the normal strain was more toxic than that prepared from the rough strain.

Arkwright,⁷ in studying paratyphoid and typhoid organisms, showed that smooth strains were considerably more virulent than rough, but that there was little difference in virulence between the smooth-non-motile and the smooth-motile forms. He further pointed out that the somatic O or S (stable) antigen of normal and smooth forms was common to virulent and absent from avirulent types, and that the H antigen, associated with flagella, and present in SM and RM forms appeared to have little influence on virulence.

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 4, 1934.

Balteanu,⁸ in his work on *Vibrio cholerae*, obtained a non-flagellated variant of the vibrio which showed apparently the same virulence as the normal flagellated organism.

Ledingham⁹ noted that the intraperitoneal injection of 2 c.c. of a 48 hour broth culture of an "avirulent" typhoid bacillus failed to kill guinea pigs, whereas 1 c.c. of a recently isolated smooth strain was lethal.

Webster and Burn,¹⁰ in a study of the relative virulence of smooth, mucoid, and rough strains of *B. enteritidis*, concluded that the smooth type was of relatively high pathogenicity for mice and that the mucoid and rough variants were markedly less virulent. Furthermore, the phage-resistant variants (S, mucoid, or R) were all less virulent than the usual smooth-susceptible strains.

Larkum,¹¹ in a study of 6 strains of *B. typhosus* Rawlins obtained from different sources, found only one of these strains to be typically smooth in its reactions. Three of the remaining 5 cultures, together with known R and S cultures were tested for virulence in guinea pigs by intraperitoneal injection of growth from two 18 hour slants. Only one strain and the R control failed to kill.

Shwartzman³ attempted unsuccessfully to raise the virulence of a strain of *B. typhosus* by 53 mouse passages. He noted, however, that rough strains were less virulent than their parent stock strains, and that mouse passage caused a change in reacting powers and antigenicity, as evidenced by the local skin reactivity, with or without loss in agglutinability.

Grinnell¹² found that both smooth motile and smooth non-motile strains of *B. typhosus* were approximately 100 to 1,000 times more virulent for mice, as judged by intraperitoneal killing power and resistance to bactericidal action, than motile or non-motile rough strains. He concluded that it was impossible to

express accurately the difference in the virulence of various strains as a difference in m.l.d. since the per cent mortality with smooth strains decreased very slowly as the dose was reduced.

Perry, Findlay, and Bensted,¹³ however, obtained strikingly consistent results in mice by intraperitoneal inoculation of 18 hour broth cultures. The m.l.d. (amount to kill 100 per cent of mice in 48 hours) of the Rawlins strain was ascertained to be 500 millions, and that of 2 recently (2 years) isolated smooth strains to be 40 millions. In a rough condition, however, one of these latter strains killed only 14 per cent of the mice with such dosage. The virulence and smoothness of the Rawlins strain was found to be markedly increased by 3 mouse passages and the m.l.d. was reduced from 500 millions to 40 millions, accompanied by the development of a pure smooth strain.

Maltaner¹⁴ injected living rough and smooth variants of *B. typhosus* intravenously into rabbits and demonstrated that only smooth variants possessed invasive properties as determined by development of the carrier state, whereas no difference could be detected in toxicity or power to produce rapid death by this method.

Felix and Pitt²⁴ concluded from their work that the intraperitoneal virulence of *B. typhosus* for mice was intimately associated with resistance to the action of the O antibody. Inagglutinable smooth strains were highly virulent, while agglutinable smooth strains were of low virulence. Rough strains were found to be of low virulence.

In earlier experiments, we made an attempt to develop a virulence test for typhoid bacilli by intraperitoneal injection of mice. A counted suspension of the growth from an 18 hour agar culture was used. The m.l.d. for our culture of the Rawlins strain was found to be approximately 1,600 million organisms, and that for a recently isolated

smooth strain, No. 99, to vary between 300 and 500 million organisms. The m.l.d. of our culture of the 0901 strain was slightly greater than 400 million organisms.

These results led to the conclusion that, although this method showed wide difference in virulence, the large number of organisms required for an m.l.d. indicated insufficient sensitivity for the detection of relatively slight differences in virulence. It seemed desirable to secure a method which would produce death with fewer organisms than is required by the intraperitoneal route. Intracerebral injection seemed to provide such a method.¹⁵

Technic of Test—The organisms used were (1) *B. typhosus* No. 99, a recently isolated smooth, motile strain, (2) *B. typhosus*, Rawlins, the Public Health Service strain obtained by us in 1919, an intermediate type with colonies irregular in outline but not typically rough, and (3) *B. typhosus*, 0901, the Felix strain, from which we obtained a smooth, non-motile culture.

The bacterial suspensions were prepared as follows: Growth from an 18 hour agar slant was suspended in 10–20 c.c. of physiological saline and the number of organisms per c.c. determined by direct count in a Helber counting chamber. The suspension was then diluted so as to contain 2,000 million organisms per c.c. Serial dilutions, designed to give the desired number of organisms in the infecting dose, were prepared just prior to injection.

Adult white mice of 15–20 gm. average weight were used. Intracerebral injections of mice were performed under ether anesthesia. Although the mice could tolerate an intracerebral dose having a volume of 0.1 c.c., the infecting dose chosen was contained in a volume of 0.05 c.c., so as to minimize physical injury and yet retain reasonable accuracy in measuring the volume.

The results obtained in terms of

m.l.d. by intracerebral administration of organisms were as follows: The m.l.d. for *B. typhosus* No. 99 was fixed at 20,000 organisms. Below this figure death occurred in varying percentages of the mice inoculated. For *B. typhosus*, Rawlins, an m.l.d. of 20,000,–000 organisms was obtained. *B. typhosus*, 0901, gave an m.l.d. of 2,000,–000 organisms.

Symptoms and Autopsy Findings *—

A constant syndrome was produced in the mice following the intracerebral injection of organisms. Recovery from the anesthesia and shock of injection was ordinarily quite rapid. Symptoms of infection—lassitude, roughing of fur, anorexia, tendency to lean against cage or lie down, diarrhea in some animals—usually appeared within 6 to 8 hours or not until 24 hours. For a few hours prior to the animals' death, a markedly increased response to stimuli was noted. If recovery took place, either no symptoms were observed or they were of a day's duration, seldom lasting beyond 24–36 hours. The majority of the mice died within 48–72 hours, but occasional deaths occurred up to 7 days. With one exception, mice surviving this period have not succumbed to the infection at a later date.

On autopsy, some subcutaneous hemorrhage was occasionally seen at the site of injection. Upon removal of the skull, the surface of the brain tissue usually appeared congested and somewhat hemorrhagic. Gross dissection of the brain tissue showed a definite congestion and generalized or localized hemorrhage, and there was a noticeable softening of the tissue itself. Microscopically, the picture was one of acute disseminated encephalitis. Multiple microscopic foci of acute inflammatory infiltration were found, both within the cerebral hemispheres and within the

* We are indebted to Dr. N. W. Larkum and to Dr. Hazel R. Prentice for aid in the pathological examinations.

cerebellum. Some of these foci showed marked hemorrhage. Beneath the meninges there was a similar exudate. No marked evidence of degeneration in tissue apart from the foci of infection was present. Other organs and tissues showed no gross pathological changes.

Smears of the brain tissue from fatally infected mice showed relatively large numbers of bacilli, and a considerable number of white blood cells. Phagocytosis of bacilli was usually present to some degree. Gram stains showed characteristic short Gram-negative rods, usually occurring singly.

Culture of the brain yielded profuse growth of typhoid bacilli in pure culture. The organism also was isolated from the spinal cord in the lower thoracic and lumbar regions. Heart blood cultures were negative—only 1 of more than 100 autopsied mice yielded positive results.

In order to determine whether or not multiplication had taken place, one group of mice was killed by etherization at intervals up to 2 hours following injection and compared with a second group allowed to succumb to the infection. Equivalent quantities of the brain tissue from each group of mice were streaked on agar plates. Only occasional colonies were obtained from the brain tissue of etherized mice in contrast to the profuse growth obtained from the mice expiring as a result of the infection. The same contrast was noted in stained smears.

Strains after mouse passage gave typical fermentation reactions, agglutinated with anti-typhoid serum (although in some cases to a lower titer than the original), and showed little change in colony morphology. After 3 passages through mice, using injections corresponding to the m.l.d., no detectable changes in colony morphology were noted in the 0901 and No. 99 strains. The surface of the Rawlins colonies seemed somewhat smoother but were still irregular in outline. The titer of O antibody in immune rabbit serum

produced with this organism after 3 mouse passages, however, was 8 times higher than that produced with the original strain.

Mice which survived the injections, either naturally or as a result of the protective action of immune serum, were killed and autopsied at weekly intervals. Cultures from the brain contained typhoid bacilli up to 5 or 6 weeks following the injection. Beyond this period, the results so far have been negative. Some of the strains so obtained were quite rough in character; others had not changed, at least in colony morphology. Further study of these cultures, as well as the pathological reactions involved, if any, is in progress. It is possible that a carrier condition has been encountered.

A series of mice were injected intracerebrally with 0.05 c.c. of physiological saline, a second series with killed organisms, and a third series with saline intracerebrally and living organisms intraperitoneally. Neither saline nor killed organisms (100 million) had any apparent effect upon the mice. The injection of 0.025 c.c. of saline intracerebrally did not increase the susceptibility of the mice to living organisms administered intraperitoneally.

Virulence of the typhoid bacillus for laboratory animals is judged by its ability to invade and multiply in the tissues of the animal, and to cause disease or death by toxic action. In both the intraperitoneal and intracerebral methods the organisms are introduced parenterally into the mouse. In the former, invasiveness and multiplication can be demonstrated by the presence of the organism in the blood stream and organs¹⁶ in increased numbers; in the latter, by the presence of the organism in the entire central nervous system, including the spinal cord, in increased numbers. A blood brain barrier is apparently effective in preventing the organisms from producing a bacteremia

and generalized invasion of the animal following intracerebral administration. In both cases, death is presumably caused by the toxicity of the growing and disintegrating organisms in the animal, since killed cultures and filtrates in equivalent quantities do not cause death.

No correlation was obtained between weight of the mice and resistance to the infecting dose; in fact, the average weight of animals surviving was slightly less than that of animals succumbing.

This method of determining virulence has yielded more satisfactory results in our hands than has the method of intraperitoneal inoculation used by Grinnell and by Perry, Findlay, and Bensted. Not only were we able to produce death with smaller numbers of organisms, but a greater difference could be detected in the virulence of different strains.

A summary is given in Table I of the m.l.d. determinations with these strains by both intracerebral and intraperitoneal inoculation. By the intracerebral method the recently isolated strain (No. 99) was 1,000 times more virulent than our Rawlins strain; by the intraperitoneal method it was 4 times more virulent. By the intracerebral method, No. 99 was 100 times more virulent than the 0901 strain; whereas it was but slightly more virulent by the intraperitoneal method. The 0901 culture was 10 times more virulent than the Rawlins by the intracerebral method and less than 4 times more virulent by the intraperitoneal method.

In a comparison of the results obtained in the two methods with each culture, the intracerebral route was 80 times more sensitive than the intraperitoneal route in the case of the Rawlins culture, more than 200 times in the case of the 0901 culture, and 20,000 times in the case of the No. 99 culture.

From these results it appears that the method is more favorable to the virulent culture and shows a greater sensitivity as the virulence of the culture becomes greater. However, the number of cultures examined so far has been small. Further work is being carried on with a larger number of cultures obtained from various sources and of varying degrees of virulence.

II. PROTECTION TESTS

The immunological significance of H and O antigens and rough and smooth forms of the enteric group of organisms is becoming more important as the knowledge of these factors increases. The work of Felix,¹⁷ and Felix and Olitski¹⁸ indicated that the bactericidal, opsonic, and complement-binding activities of immune serum are produced by the action of the smooth somatic antigen. Braun and Nodake,¹⁹ and Balteanu⁸ believe, however, that both flagellar and somatic antigens (ectoplasm and endoplasm of Braun) are involved in these reactions. Hofmeier²⁰ believes that both antibodies are important for complement-fixation and phagocytosis, but that only the somatic or endoplasmic antibody is of importance in the bactericidal action of immune serum.

TABLE I

<i>Method of Inoculation</i>	<i>Strain</i>	<i>m.l.d.</i>
Intracerebral	Old culture, intermediate colonies (Rawlins)	20,000,000
	Recently isolated culture, smooth colonies (No. 99)	20,000
	Old culture, smooth colonies (0901)	2,000,000
Intraperitoneal	Old culture, intermediate colonies (Rawlins)	1,600,000,000
	Recently isolated culture, smooth colonies (No. 99)	400,000,000
	Old culture, smooth colonies (0901)	> 400,000,000

In a study of the prophylactic value of vaccines prepared from rough and smooth forms of organisms, Ledingham²¹ found that guinea pigs immunized with either living or killed avirulent (rough) typhoid bacilli (unable to kill a guinea pig by intraperitoneal injection of 2 c.c. of a 48 hour broth culture) were not protected against the inoculation of 1 c.c. of a recently isolated smooth, virulent strain. In passive protection experiments with guinea pigs, he found that guinea pig serum prepared against either living or dead organisms showed protective action in the highest concentration (1 c.c. of undiluted serum) when the guinea pigs were injected with 1 c.c. of a 48 hour living broth culture of virulent *B. typhosus*.

Arkwright⁷ found that when guinea pigs were immunized with smooth and rough strains of *B. paratyphosus* A, the smooth vaccine gave protection, the rough did not in all cases and to a much less extent. Moreover, heating the S vaccine at 100° C. did not diminish its protective value. The same results were obtained with *B. typhosus* although to a lesser degree—the S vaccine, either motile or non-motile gave decidedly more immunity than the R motile.

Ibrahim and Schütze,²² in a study of the prophylactic value of the H, O, and R antigens of *Salmonella aertrycke*, and of the toxicity of its smooth and rough variants, found that a vaccine containing both H and O antigen gave the best and most prolonged protection in mice; whereas a vaccine from the rough variant, whether it contained H or not, was ineffective. He further noted, however, that heating an S vaccine to 100° C. in order to destroy the thermolabile H antigen reduced the prophylactic value of the vaccine, and he believes that this may be due to a coincidental damaging of the vaccine as an immunizing agent. He further found that autolyzed filtrates of the rough variant

were approximately one-fourth as toxic as those of the smooth variant.

Grinnell,²³ in a study of the bactericidal action of human serum after vaccination with rough and smooth strains of *B. typhosus*, found that vaccination with a smooth virulent strain caused a considerable increase in the bactericidal antibodies; whereas vaccination with a rough strain of *B. typhosus* Rawlins produced little or no increase in the bactericidal power of the blood, although agglutinins for the virulent strain were present. In further studies¹² he found that after immunization of mice with a smooth virulent strain, a mortality of only 5.4 per cent occurred following intraperitoneal injection of a smooth strain in a dose which killed 95 per cent of the control mice. After a similar immunization with a rough Rawlins culture, 91.6 per cent of the mice died.

Perry, Findlay, and Bensted,¹³ in a study of active immunization of mice with vaccines prepared from a Rawlins strain, and from smooth and rough variants of a virulent strain, found that the Rawlins vaccine gave little protection; whereas the vaccines from both the rough and the smooth variants gave marked protection although the smooth vaccine appeared somewhat more effective. Two minimum lethal doses of a smooth virulent strain constituted the test dose. In further studies of the protective power of undiluted rabbit antiserum for mice, these authors concluded that within the limits of the test there was evidence of relationship between the O titer and the protective power of the serum. Owing to the nature of the test, they found that it was not possible to judge the comparative values of sera having O titers of 1–250 and less. They also found that active immunity, judged by protection, could be produced in mice without agglutinin response. From these results they concluded that the bactericidal

property of the blood appeared to be the sole laboratory test that could be employed with any prospect of success. The results of bactericidal tests showed that the smooth vaccine was markedly superior in raising the bactericidal power of human blood, but that little difference could be noted between partially rough and markedly rough vaccines.

Maltaner,¹⁴ in a study of the prophylactic value of rough and smooth strains and the resultant immunity, found that vaccination of rabbits by the intravenous method with either rough or smooth variants gave protection against approximately 14 times the minimal invasive dose of smooth living bacilli as indicated by blood and bile cultures. The rough vaccines protected distinctly better than the smooth, although antisera prepared from flagellated and non-flagellated rough vaccines possessed no specific agglutinins for the smooth infecting strain, with the exception of flagellar agglutinins in the case of the flagellated vaccine. In both rabbits and guinea pigs, vaccination with either rough or smooth variants was found to produce marked phagocytic response to subsequent injection of living smooth organisms, whereas the response in control animals was slight.

Felix and Pitt,²⁴ in their latest work, have presented evidence of a new antigen, termed "Vi," which was present only in inagglutinable, smooth *B. typhosus* strains of high virulence. Antiserum produced by immunizing rabbits with living inagglutinable strains was capable of specifically clumping the inagglutinable organisms to a varying titer (1-100 to 1-400) depending upon the organism used. This titer was independent of the H and O titers; the antibody could not be removed by absorption with agglutinable strains, but was absorbed by inagglutinable ones. The virulent inagglutinable strains were markedly superior as antigens for active immuniza-

tion of mice. In passive protection experiments with mice the "Vi" antibody content seemed to determine the protective action of the antiserum, but was apparently unable to neutralize the toxicity of killed organisms. Neutralization of toxicity was attributed to the action of the O antibody.

The discordant results in the literature and the lack of an adequate method of measuring the protective action of antisera against typhoid bacilli of established virulence and antigenic composition have led to the following experimental work.

Attempts to measure the protective action of two antisera containing high titers in H and O agglutinins respectively were carried out using intraperitoneal injection into mice of both organisms and antisera. Marked protection was shown with both the antisera when low dilutions or relatively large amounts of antiserum were used for protection. When higher dilutions of the antisera were used, however, satisfactory comparisons could not be made, in confirmation of the results obtained by Perry, Findlay, and Binsted. It seemed likely that the inability of serum dilutions to protect might be due, in part at least, to the large numbers of organisms required for a minimum lethal dose by intraperitoneal injection. For this reason, experiments were carried out using the intracerebral injection of organisms to test the degree of protection afforded by the various antisera under examination.

Preparation of Immune Sera—Antityphoid sera were prepared in rabbits by two methods: (1) three intradermal injections of 0.1 c.c. of the bacterial suspension, standardized to contain 1,000 million organisms per c.c., were made at 7 day intervals; and (2) repeated intravenous injections of killed organisms and, finally, of living organisms, were given at 4 to 6 day intervals until a high agglutinin titer had de-

veloped. Bleedings were made 7 days following the last injection.

Agglutinin Titrations of Antisera—The H and O antibody content of the antisera was determined by titration with a rough variant of the Rawlins culture and a smooth non-motile variant of the 0901 culture. Typical flocculent and granular agglutinations were obtained with these suspensions. The usual agglutination technic was employed in these tests.

Bacterial Suspensions—The suspensions of smooth virulent typhoid bacilli for the test dose were prepared and standardized as described in the preceding section. The recently isolated smooth strain, No. 99, was used as the test organism.

Mouse Protection Tests Using Intracerebral Injection of Both Organisms and Antisera—Protection tests were carried out by injecting both organisms and antiserum, mixed just prior to injection. Inconsistent results were obtained, however, which were found to be due in part to a primary toxicity which some of the antisera exerted when administered by this route.

Preliminary experiments showed that protection against intracerebral injections of organisms could be obtained by intraperitoneal injection of antisera. Experiments were then carried out to determine the most satisfactory time interval between the injection of antiserum and the test dose of organisms.

Effect of Time Interval between Injection of Antiserum and Organisms—Antiserum was administered intraperitoneally to different groups of mice at intervals of 5 and 2 hours before the intracerebral injection of organisms, simultaneously with the organism injection, and 5 hours after the organism injection. No significant difference in the protective action could be noted when the antiserum was given before or simultaneously with the organisms, but somewhat less protection occurred when

the antiserum was administered 5 hours after the intracerebral injection of the organisms. An interval of $2\frac{1}{2}$ hours between the injection of antiserum and organisms was arbitrarily selected for the following experiments.

Effect of Complement upon Protection—The effect of complement upon the protective action of antisera was determined by comparison of 4 antisera in fresh and inactivated states and with the addition of guinea pig complement to the inactivated serum. The amount of complement arbitrarily chosen was 2 units as determined by hemolytic titration with a standard amboceptor. In this dose complement had no apparent effect upon the protective activity of inactivated serum. Furthermore, no significant difference in protective activity could be noted between fresh and inactivated antisera.

Mouse Protection Tests Using Intraperitoneal Injection of Antiserum and Intracerebral Injection of Organisms—In preliminary experiments using intraperitoneal injection of antiserum and intracerebral injection of organisms the following results have been obtained: An antiserum prepared against an organism of moderate virulence, 0901, and giving an H agglutinin titer of 1–2,560 and an O titer of 1–20,480, gave definite protection against 10 m.l.d. even in dilution of 1–100; whereas an antiserum against the same organism with an H titer of 1–80 and an O titer of 1–640 showed little significant protection.

No difference was observed in the protective action of two antisera prepared respectively from relatively avirulent and virulent organisms and having H agglutinin titers of 1–80 and 1–5,120 and O titers of 1–5,120 and 1–2,560. Both antisera protected against 2 m.l.d. of the test culture.

No conclusions can be drawn from these preliminary experiments. Further work is in progress.

SUMMARY

Intracerebral injection into mice is recommended for measurement of the relative virulence of strains of the typhoid bacillus. In our hands this method of injection has given more satisfactory results than the intraperitoneal route.

Intracerebral injection of organisms combined with intraperitoneal injection of antisera is suggested as a method for measuring the protective value of these sera against typhoid bacilli. The data so far obtained do not justify definite conclusions, but serve to indicate the feasibility of the technic and a possible correlation between virulence, H and O agglutinins, and protective activity of the antityphoid sera.

REFERENCES

1. Weil, E., and Felix, A. *Wien. klin. Wchnschr.*, 30:1509, 1917.
2. Weil, E., and Felix, A. *Ztschr. f. Immunitätsforsch.*, 29:24, 1920.
3. Schwartzman, Gregory. *J. Exper. Med.*, 52:781, 1930.

4. Pfeiffer and Kolle, quoted by Baerthlein, K. *Handbuch der Path. Mikroörg.*, Jena, 3:1175, 1931.
5. Kutscher and Meinicke, quoted by Baerthlein, K. *Handbuch der Path. Mikroörg.*, Jena, 3:1175, 1931.
6. Goyle, A. N. *J. Path. & Bact.*, 29:365, 1926.
7. Arkwright, J. A. *J. Path. & Bact.*, 29:318, 1926; *ibid.*, 30:345, 1927.
8. Balteanu, I. *J. Path. & Bact.*, 29:251, 1926.
9. Ledingham, J. C. G. *J. State Med.*, 34:2, 1926.
10. Webster, L. T., and Burn, C. *J. Exper. Med.*, 46:887, 1927.
11. Larkum, N. W. *A.J.P.H.*, 18:647, 1928.
12. Grinnell, F. B. *J. Exper. Med.*, 54:577, 1931; *ibid.*, 56:907, 1932.
13. Perry, H. M., Findlay, H. T., and Bensted, H. J. *J. Roy. Army Med. Corp.*, 60:241, 1933; *ibid.*, 61:81, 1933; *ibid.*, 62:161, 1934.
14. Maltaner, Frank. *J. Immunol.*, 26:161, 1934.
15. Sawyer, W. A., and Lloyd, W. *J. Exper. Med.*, 54:533, 1931.
16. Menk, W., and Schreiber, W. *Ztschr. f. Immunitätsforsch.*, 75:503, 1932.
17. Felix, A. *J. Immunol.*, 9:115, 1924.
18. Felix, A., and Olitski, L. *J. Immunol.*, 11:31, 1926.
19. Braun, H., and Nodake, R. *Centrolbl. f. Bakteriöl.*, 1 Abt., Orig., 92:429, 1924.
20. Hofmeier, K. *Ztschr. f. Immunitätsforsch.*, 50:71, 1927; *ibid.*, 50:509, 1927.
21. Ledingham, J. C. G. *J. State Med.*, 34:2, 1926; *ibid.*, 34:63, 1926.
22. Ibrahim, H. M., and Schütze, H. *Brit. J. Exper. Path.*, 9:353, 1928.
23. Grinnell, F. B. *J. Immunol.*, 19:457, 1930.
24. Felix, A., and Pitt, R. M. *J. Path. & Bact.*, 38:409, 1934; *Lancet*, 227:186, 1934.

Dangers to Health of Uninterrupted Working Periods

THE medical committee of the German Society for Industrial Hygiene has set up "principles for regulating the hours of work and of recesses from the standpoint of health." These principles state that the uninterrupted working period is detrimental to health, and they reject it. They recommend the introduction of a divided working time

wherever the management of the establishment and the transportation permit it. They recommend a noon recess of 2 hours, so that the worker may be enabled to go to his home. When this is impossible there should be suitable recesses so that the workers may take a warm meal at their place of work at noon.—*Penn. M. J.* 38, 6:426 (Mar.), 1935.

A Semi-Automatic Bacteriological Dilution Bottle Filler

PAUL S. PRICKETT, PH.D.

Bacteriological Laboratory, Mead Johnson & Co., Evansville, Ind.

THIS apparatus* has been designed and in use for several years in the author's laboratory where it has invariably attracted the attention of visiting laboratory workers. Because of their enthusiasm and their frequent admonitions to publish a description of the apparatus, this note is offered in the hope that it may help to solve problems in other laboratories as well as it has in this one.

The photograph is largely self-explanatory. The filler is designed to fill two dilution bottles (A.P.H.A. type) simultaneously. A slightly modified design perhaps would be necessary for other types of dilution bottles. In use, a number of empty bottles are stood at the filler's right (the operator's left as he stands facing the filler), which is mounted in this laboratory on the drain-board of a sink. With his left hand the operator places two bottles at A while his right hand moves the valve-actuating lever B which sets the synchronized, two-way valves so as to fill the measuring cylinders C. When they are full, that is, containing the required amount of water, any excess overflows at D and is carried away by the drain E. As soon as the measuring cylinders C are full, the lever or valve handle B is moved to set the valves so that the supply is shut off and the measured volumes of water are dis-

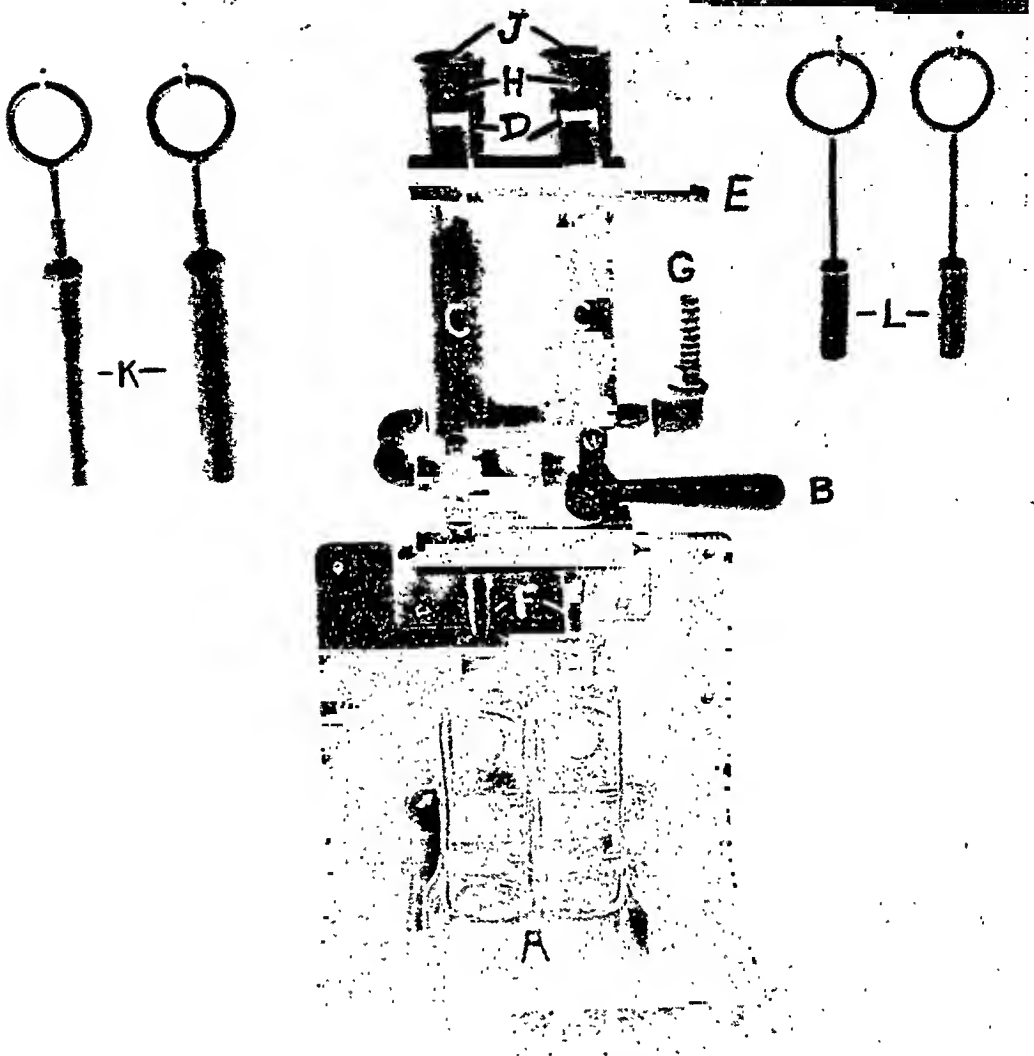
charged through the nozzles F into the bottles. Immediately after the water runs into the bottles, the lever is moved back to the filling position and, while the measuring cylinders are refilling, the filled bottles are removed to the left of the filler, and two empty bottles put in place.

The water inlet, shown at G, may be connected with either the tap or a distilled water supply. Distilled water is used in the author's laboratory and consists of a 5 gallon bottle on an overhead shelf. The overflow from the drain can be collected and saved, if distilled water is used, or it can be run into the sink. It is our experience that with a little practice not enough water is wasted to pay to save it.

The set screws H hold movable sleeves J within the measuring cylinders C that are adjustable. Since these sleeves form the lip of the overflow the amount of water held and delivered by the measuring cylinders is governed by raising or lowering the sleeves.

In this laboratory 45 c.c., 90 c.c., and 99 c.c. dilution blanks are used extensively, hence the filler was made so that all three volumes are easily obtained. To obtain 45 c.c. dilution blanks the solid cylinders K are put in the measuring cylinders C to displace the necessary amount of water. The solid cylinders L are used in the same way to secure 90 c.c. dilution blanks, while to obtain 99 c.c. dilution blanks no displacement cylinders are used in

* Built by George Koch Sons, Evansville, Ind., who also aided in designing it.



the measuring cylinders. The filler is set to deliver a slight excess of water to each bottle to compensate for the water evaporated during sterilization.¹

The etched marks on the bottles, shown in the picture, are 45 c.c., 90 c.c., and 99 c.c. calibrations. *Standard Methods of Milk Analysis*² recommends a 99 c.c. calibration mark. Since we use large numbers of the three different water blanks we find it helpful to calibrate our bottles as it assures greater accuracy in the volumes of dilution water and also prevents confusion of the different dilution blanks.

Numerous tests and checks have

shown that this dilution bottle filler delivers accurate volumes of water. Being made of nickel plated brass and monel metal it does not corrode and its cost of upkeep has been nil. We previously filled our dilution blanks from a 100 c.c. burette equipped with a side arm attached to a distilled water supply. We find that we can fill dilution bottles as accurately and in one-fourth to one-fifth the time previously required.

REFERENCES

1. Noyes, H. A. Sterilizing Measured Amounts of Water in the Autoclave. *J. Bact.*, 3:537-539, 1918.
2. *Standard Methods of Milk Analysis*. American Public Health Association, New York (6th ed.), 1934.

Use of Toxoid Unprecipitated, Toxoid Precipitated and Toxin-Antitoxin Flocculi

WILLIAM H. PARK, M.D., F.A.P.H.A.

Director of Laboratories, New York, N. Y.

THE toxoid precipitate because of its very slight solubility is by far the most immunizing of the toxoid products. Its disadvantages are that it causes much greater local and constitutional reactions in older children and adults than does the toxoid-antitoxin flocculi and somewhat more than the same quantity of toxoid in the fluid form. Also when care is not taken to keep the amount of alum in the vaccine under 5/10 per cent, there is a tendency for the injection to produce an abscess. When the precipitate is concentrated it is apt to contain an excessive amount of alum. The federal regulations therefore require that the amount of salt solution with the precipitated toxoid should equal the original amount of broth.

Unprecipitated diphtheria toxoid either with or without the addition of 2/10 per cent alum is a much more efficient immunizing agent than toxin-antitoxin although much less than an equal number of units of the toxoid precipitate. Abscesses almost never follow the injections of toxoid in solution. When we consider the percentages of successful immunization in small groups of children, we should remember that the majority of them react readily in producing antitoxin from the injected toxoid, and of the minority only 2 to 5 per cent are much more resistant. Different groups of children necessarily

have different proportions of the more resistant children. For this reason when small groups are vaccinated a rather weak preparation may occasionally give as good or better figures than a strong one in another small group. We also realize that a month after immunization, fewer children have become Schick negative than at the end of 2 months, and, unless all have become negative by that time, than at the end of 3 or more months. One very important thing to consider is that it is the potency of the toxoid as well as the quantity of the fluid injected, which is of importance. The potency is determined by testing the number of antigenic units present which under most conditions can be considered the same as the flocculation units. Therefore, $\frac{1}{4}$ c.c. of one preparation may have all the antigenic value of 1 c.c. of another preparation. Until a year ago 10 or 15 antigenic units in 1 c.c. of toxoid solution were about the best that could be regularly made. If, therefore, the flocculation or antigenic units are not given, we have no way of knowing the immunizing value of the preparation except through the results obtained in immunizing children.

In closing, I want to give some statistics which bring out the fact that the majority of very young children are readily immunized by any fairly potent

preparation, and that there is an unknown minority in any given group who are more resistant. The first is a group of 269 children about equally divided in ages between the first 4 years of life. Of these, 269 received a single injection of $\frac{1}{2}$ c.c. of a 40 antigenic units per c.c. preparation. The 20 units of toxoid were in the form of the alum precipitate. At the end of 1 month 264 gave a negative Schick reaction and 7 remained positive, and at 2 months 268 gave negative and 1 a positive reaction, a percentage of success of 97.3 and 99.6. At the end of 1 month 66 per cent of the children still showed locally at the point of the deposit of the precipitate, gradually disappearing nodules some of which at first were from $\frac{1}{2}$ to 1 cm. in diameter. No abscesses developed.

As a contrast, I give the results of an early test using an alum precipitate containing but $8\frac{1}{2}$ flocculation units in each c.c. One hundred sixty-one children received a dose of 1 c.c. of this toxoid. At the end of 1 month 105 had become negative while 56 remained positive; at the end of 2 months 140 children gave negative Schick tests and 21 positive, and at the end of 3 months, all were negative. Here we see that a comparatively small amount of the toxoid precipitate gave 100 per cent of immunity at the end of 3 months but a large percentage had not changed in 1 month.

The results obtained from the use of a preparation of toxoid in the fluid form both with and without the addition of 0.2 per cent of alum. Two injections of 1 c.c. of a preparation of about 9 flocculation units given at intervals of 2 weeks, gave the following results at the end of a year. First a preparation having no alum added having about 500 school children injected, gave at the end of the year 93 per cent of negative tests. A second test was done with toxoid with 0.2 per cent of

alum added. In this case 95 per cent gave negative reactions at the end of a year. These tests were carried out by Dr. Volk of Pontiac, Mich., with toxoid made in this laboratory.

In another test of the fluid toxoid without alum, 71 small children aged from 9 months to 4 years were given a single injection of 1 c.c. of 40 flocculation units. At the end of 1 month 77.4 were negative; at 2 months 88.7, and at 3 months 90 per cent. This is a fairly average result.

The final preparation that I wish to speak of is the toxin-antitoxin flocculi. This as you know was developed by Dr. Povitzky in our laboratory. The flocculi formed by the union of a suitable amount of antitoxin to the toxoid are washed, resuspended, and heated to 80° for $\frac{1}{2}$ hour. This destroys the antitoxin but hardly affects the toxoid. In 42 nurses given an injection of a preparation containing over 40 flocculation units per dose, 78 per cent had developed a negative Schick test at the end of 1 month, and 94 per cent at the end of 3 months. Before we used the flocculi the nurses complained of the severe reactions, but not after we began to use the toxoid-antitoxin flocculi.

In New York City, at the present time we are using the toxoid precipitate in all children under 5, giving a single dose of 1 c.c. containing from 20 to 40 antigenic units. Undoubtedly doses of $\frac{1}{2}$ c.c. would give nearly the same results so far as the percentage of children becoming Schick negative is concerned; but the average amount of antitoxin developed in the children and its duration in them would of course be less. In the older children and adults we are giving a fluid toxoid either with or without $\frac{2}{10}$ per cent of alum or the precipitate. The first injection is $\frac{1}{10}$ c.c., the second injection given at an interval of either 2 or 4 weeks has from $\frac{1}{10}$ to 1 c.c., according to the

local reaction of the first dose. It seemed to us unwise to produce the occasional annoying but not otherwise harmful reaction which sometimes follows injections in school children of a first large dose as these disturb the parents. It seemed better to give a testing dose of a small amount to be followed according to the reaction by a larger or full dose. Even 1/10 c.c. of a good preparation contains about 3 antigenic units which is one-third the size of what was a full dose 1 year ago. We certainly have in these 3 preparations, suitable immunizing material for all infants, children and adults.

What Is Public Health?

IS not public health merely a matter of water supplies, ventilation, sewage, clinics, drains, street cleaning, garbage, infectious diseases, public health nurses, flies, dirt, slums, and serums? True it is that these items are all in it. But they no more constitute public health than mere paint, canvas, and brushes constitute art; or mere iron ore and smelters constitute architecture; or rods, lines, and nets constitute the fishing industry; or axes and wire rope constitute lumbering; or schoolhouses and textbooks constitute education. All these items are merely the tools of the arts. The tools of an art are essential to the art; but they do not constitute the art. Art is the result achieved; it is that object toward which tools merely perform the shaping of the path. . . .

That public health originated in the attempt to relieve crude physical suffering and especially to achieve this only by preventing disease, does not take

from its present or future immensely greater importance. That it has reached already its present outstanding influence is proof enough of its inherent strength, a strength derived wholly from its truth—that is, its correspondence with, not things just dreamed about, but things that are—not with just some things in the universe but with all things. . . .

The common objective of medicine and of public health is the reduction of human misery due to disease and death. The one devoted itself to the relief and cure of those already suffering, the other to prevention. Since neither fully succeeds, each must continue to supplement the other. Each in its own field has made enormous advances from each its own angle. Coöperation is increasing as each understands the other's problems better.—H. W. Hill, M.D. *California & West. Med.* 42, 2:139 (Feb.), 1935.

Diphtheria Studies II

Use of Intradermal Injections of Toxin-Toxoid Mixtures in Diphtheria Immunization *

WILLIAM EDWARD BUNNEY, PH.D.

*Associate Director, Bureau of Laboratories, Michigan Department of Health,
Lansing, Mich.*

THE purpose of this investigation has been to determine whether or not it would be possible to use an intradermal injection of a toxin-toxoid mixture for the dual purpose of immunizing and testing for immunity against diphtheria.

The ideal mixture would be one which functioned as a Schick test and at the same time always conferred immunity. This ideal has not yet been achieved, but some interesting immunologic observations have been made.

Several theories led us to study this problem. It seemed possible that the addition of a slight, standardized amount of the toxic principle to diphtheria toxoid might increase its antigenicity. The work of Ramon¹ with tapioca and calcium chloride, and of Glenny² with alum, suggests the possibility that part of the increased immunologic response to toxoid when these substances are added may be due to the local irritation which they induce. It seemed possible to us that the toxic effect of the free toxin might function similarly. Also the fact that it requires roughly 50 times as much toxin to pro-

duce a toxoid of antigenic value equal to a 0.1 L+ toxin-antitoxin mixture suggests that the greater efficiency of the toxin in the toxin-antitoxin mixture may in part be due to the free toxicity present. Another explanation for the increased immunologic response when tapioca, calcium chloride, or alum is used, is that they delay absorption of the toxoid, spreading its stimulus over a period of time and so in effect obtaining multiple stimuli with a single injection. Since absorption of material injected intradermally is known to be slower than that of material injected subcutaneously or intramuscularly it seemed that this slower absorption might increase the effectiveness of an intradermal injection. Finally, the work^{3,4} showing an increase in circulating antitoxin from repeated Schick tests gave added evidence of the possibilities in the study.

The first step was to determine whether toxoid could be made sufficiently formaldehyde-free to give a stabile mixture when added to toxin. The optimum concentration of toxoid also had to be determined and the efficacy of the mixtures established as accurately as possible on guinea pigs before human use.

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting at Pasadena, Calif., September 6, 1934.

TABLE I
STABILITY OF TOXIN-TOXOID MIXTURES

Preparation No.	Toxin No.	pH	Lt's per 0.1 c.c.	Diluent	Maintenance of Complete Toxicity at 37.5° C. in Weeks
1	12	8.4	4.0	Borax Buffer	3
2	12	8.4	4.0	" "	3
3	12	8.4	1.5	" "	1/7
4	12	8.2	1.5	0.05% Protone	1
5	12	8.4	1.0	" "	8
6	12	7.4	1.0	" "	8
7	21	8.6	0.5	" "	3
8	21	7.6	0.5	" "	2
9	47W	8.6	0.5	" "	3
10	47W	7.6	0.5	" "	1
11	12	8.4	0.5	" "	8
12	21	8.4	0.5	" "	5

The work falls into 3 parts: (1) Study on guinea pigs to determine stability of the toxin-toxoid mixtures, and dosage and antigenicity. (2) Results in immunizing infants, children of school age, and adults. (3) Interpretation of the reaction in adults by comparison with the blood antitoxin content.

METHODS

The toxoid was purified by precipitation with alcohol and hydrochloric acid⁵ followed by solution in the borax-boric acid diluent of Glenny, Pope and Waddington.⁶

The mixtures of toxin and toxoid were diluted with 0.05 per cent protone⁷ solution containing 0.85 per cent NaCl and adjusted to pH 8.0. For preservative, merthiolate was added to make a 1-10,000 dilution. The final concentration of the toxin was always Schick strength (1/50 m.l.d. per 0.1 c.c.), only the toxoid concentration being varied in different preparations.

The method of drawing the bloods from adults and of titrating the serum has been described.⁸ Blood was drawn not more than 24 hours before doing the Schick test.

RESULTS AND DISCUSSION

Stability of toxin-toxoid mixtures and their antigenicity for guinea pigs:

Previous work⁹ substantiated the results of Glenny, Pope and Waddington⁵

in showing that if a toxin diluted to Schick strength is stable for 24 hours at 37.5° C., it will be stable for at least 6 months at room temperature. Using this method for comparing stability, toxin-toxoid mixtures with various concentrations of toxoid were tested as shown in Table I. To test the toxicity of the incubated preparations 5 c.c. (1 m.l.d. if it was a completely toxic Schick preparation) were injected subcutaneously into 250 gm. guinea pigs. If the pigs lived longer than 4 days the preparation was considered to be no longer completely toxic. It is interesting to note that 4.0 L_t's of purified toxoid per 0.1 c.c. contained sufficient stabilizing material to maintain the toxicity of the diluted toxin during 3 weeks of incubation when diluted in the borax-boric acid buffer of Glenny, Pope, and Waddington. For concentrations of 1.5 L_t's or less per 0.1 c.c., it seemed advisable to add 0.05 per cent protone in order to stabilize the toxin. The resulting preparations were remarkably stable with the three diphtheria toxin preparations tried, as shown in Table I. Evidently purification of the toxoid removed sufficient of the detoxifying formaldehyde used in preparation.

Having a stable preparation, our next concern was to investigate the comparative antigenicity in guinea pigs of subcutaneous and intradermal injections, and of toxic and non-toxic injec-

TABLE II

COMPARISON OF METHODS OF IMMUNIZATION

<i>Preparation</i>	<i>Lt's per 0.1 c.c.</i>	<i>Method of Administration</i>	<i>No. of Guinea Pigs Injected</i>	<i>Per Cent Surviving 5 m.l.d.'s 16 Days After Immunizing Injection</i>
Toxin-Toxoid Mixture No. 2	4.0	Subcutaneously	9	70
	4.0	Intradermally	10	90
Conc. Toxoid No. 29	4.0	Subcutaneously	8	40
	4.0	Intradermally	10	50

tions. Table II shows the results. Guinea pigs weighing from 275 to 350 gm. were used in each test. The results seem to indicate an advantage, in immunizing guinea pigs, of a toxic intradermal injection over a toxic or non-toxic subcutaneous injection containing identical amounts of toxoid.

We next determined the ability of the preparations to meet the requirements of the National Institute of Health antigenicity test for toxoids. This test requires that at least 8 of 10 pigs (weighing from 275 to 350 gm.) which have 6 weeks previously received a single injection of the toxoid must survive for 10 days after an injection of 5 m.l.d.'s of toxin. All the pigs were given a single 0.1 c.c. intradermal injection of the mixtures as shown in Table III. The survival of all the pigs encouraged us to try the preparations on humans.

Antigenicity of toxin-toxoid preparations for humans:

Preliminary study on volunteer medical students showed that the reactions from a preparation containing 4.0 Lt's per 0.1 c.c. were too severe. Like-

wise the reactions from preparations containing 1.5 Lt's per 0.1 c.c., although not serious, were too large to be satisfactory for Schick use. However, preparations containing 0.5 Lt per 0.1 c.c. seemed to give reactions in children, especially those of preschool age, which were satisfactory from the standpoint of size and lack of undesirable swelling or soreness.

In Table IV are compared several immunizing procedures in infants. The median age of this group was 2-4/12, the average, 2-5/12. All children positive at the end of 1 month received additional toxoid injections but the results are not used because of the possible antigenic effect of the Schick retest. It is interesting to note the quick response of those children receiving the intradermal injection of the toxin-toxoid mixture followed by concentrated toxoid given subcutaneously (Group 1). It seems likely that the 90 per cent immunity at the end of 1 month is not due solely to the concentrated toxoid since when only concentrated toxoid was given; all 4 remained positive (Group

TABLE III

ANTIGENICITY OF TOXIN-TOXOID MIXTURES

<i>Preparation No.</i>	<i>Lt's per 0.1 c.c.</i>	<i>No. of Guinea Pigs Injected</i>	<i>Per Cent Surviving Injections of 5 m.l.d.'s 6 Weeks After 0.1 c.c. Intradermal Injections of Mixtures</i>
1	4.0	9	100
2	4.0	11	100
4	1.5	9	100
5	1.0	10	100
6	1.0	9	100
7	0.5	10	100
8	0.5	9	100
9	0.5	8	100
10	0.5	10	100

TABLE IV

COMPARISON OF DIFFERENT IMMUNIZING PROCEDURES IN INFANTS

Group	Procedure	Interval Before Re-Schick	Per Cent Negative	Number in Group
1	0.1 c.c. = 0.5 L _t Toxin-Toxoid mixture + 40 L _t 's conc. Toxoid 1 week later.....	1 month	90	42
2	Schick + 10 L _t 's regular Toxoid 1 week later.....	1 month	14	14
3	10 L _t 's regular Toxoid with no pre-Schick.....	1 month	32	81
4	40 L _t 's conc. Toxoid with no pre-Schick.....	1 month	0	4

4). This last is too small a series to be conclusive but seems significant since only 4 of the 42 babies who also received the intradermal injection remained positive. The comparatively poor results with 2 doses of concentrated toxoid given to children of school age, shown in Table V (Group 2) is additional evidence that the intradermal injection was important in the quick response and the high percentage immunized.

The results in Table V indicate that in children of school age intradermal injections of toxin-toxoid mixtures increase the antigenic response. The first 2

The study of the value of intradermal injections of toxin-toxoid mixtures in immunization of the adult was made in 2 Michigan hospitals for the insane. In the first hospital a toxin-toxoid mixture containing 0.5 L_t per 0.1 c.c. was used, controlled with the heated control of a regular Schick preparation. The results as a Schick test were obviously not reliable since 82 per cent of the persons had positive reactions of whom 42 per cent had more than 0.03 unit of antitoxin per c.c. of serum.*

These false positive reactions bring up the question of the significance of the immunization figures in Tables IV

TABLE V

COMPARISON OF DIFFERENT IMMUNIZING PROCEDURES IN CHILDREN OF SCHOOL AGE

Group	Procedure	Interval Between Last Injection and Re-Schick	Per Cent Negative	Number in Group
1	0.1 c.c. = 1.5 L _t Toxin-Toxoid mixture followed by 30 L _t 's concentrated Toxoid in 1 week and another 30 L _t 's 2 weeks later.....	1 month	95	48
2	Schick test followed by 30 L _t 's concentrated Toxoid in 1 week and another 30 L _t 's 2 weeks later.....	1 month	64	229
3	0.1 c.c. = 0.5 L _t Toxin-Toxoid mixture intradermally	6 weeks	72	18

groups which received the subcutaneous concentrated toxoid were free-living urban children, those receiving only the intradermal injection of toxin-toxoid (Group 3) were inmates of a state hospital for the feeble-minded. These last are too few for the results to be conclusive, but their significance is augmented by the fact that to start with they were all Schick positive to a regular test given at the same time as the injection of the toxin-toxoid mixture. This regular Schick test may have increased the antigenic response.

and V. Of the infants receiving intradermal injections of toxin-toxoid mixtures containing 0.5 L_t per 0.1 c.c., 95 per cent gave positive reactions. However, comparison of the results in those with no pre-Schick test (Group 3) with those in the toxin-toxoid injected group (Group 1) show the figures to be significant, especially since of necessity the toxin-toxoid group contains fewer

* The 0.03 unit was chosen as the "Schick level" because, as shown,⁸ the study of the Schick reaction in adults indicated this to be a practical dividing point.

originally negative children, only the positive reactors being injected and studied. As to the first 2 groups in Table V, if the 48 children who originally had been positive to the toxin-toxoid mixture should have been only 30 per cent positive, the per cent immunized would be 85, still a significant increase over the 64 per cent immune with the regular Schick test. Therefore it seems that in both groups, regardless of the reliability of the reactions from the toxin-toxoid injections as Schick tests, the immunity results show a definite advantage in the use of the toxin-toxoid mixtures.

In an attempt to obtain a preparation that would function as a Schick test material in the adult, the content of the toxin-toxoid mixture was reduced to 0.25 L_t per 0.1 c.c. and a control mixture prepared which was identical in every respect except that the Schick toxin was heated to atoxicity. Controlled injections were given with these preparations to alternate individuals at the second hospital, the others receiving a regular Schick test and control. The

results are shown in Table VI. The close agreement in proportion of reactions was surprising.

A comparison of the effect of the injection of 0.5 L_t of toxoid equally divided between the Schick material and its control in different immunizing procedures is shown in Table VII. Evidently the toxin-toxoid mixture raised the antigenic response in each instance. The injection of only 0.5 L_t of toxoid plus 1/50 m.l.d. of toxin followed in 1 week by 5 L_t's of toxoid subcutaneously, was at least as good an immunizing procedure as 2 doses of 5 L_t's of toxoid alone given subcutaneously with an interval of 3 weeks. It would seem that 0.5 of an L_t of toxoid plus 1/50 m.l.d. of toxin as administered here in a toxin-toxoid mixture and control is at least as efficient an antigen for the initial stimulation in a 2 injection immunizing procedure as 10 times this amount of toxoid given subcutaneously. It seems possible that either the presence of the 1/50 m.l.d. of toxin or the use of an intradermal injection, or both, has increased the antigenic response.

TABLE VI

COMPARISON OF REACTIONS FROM CONTROLLED INTRADERMAL INJECTIONS OF TOXIN-TOXOID MIXTURES CONTAINING 0.25 L_t WITH REACTIONS FROM A REGULAR SCHICK TEST IN ADULTS

<i>Procedure</i>	<i>Per Cent Negative</i>	<i>Per Cent Positive</i>	<i>Total Number</i>
Toxin-Toxoid mixture	68.4	31.6	377
Regular Schick	69.8	30.2	556

TABLE VII

COMPARISON OF DIFFERENT IMMUNIZING PROCEDURES IN ADULTS

<i>Procedure</i>	<i>Interval Between First Injection and Re-Schick</i>	<i>Per Cent Negative</i>	<i>Number in Group</i>
Toxin-Toxoid mixture and control = 0.5 L _t followed 1 week later by 5 L _t 's Toxoid	4 months	61	33
Regular Schick followed 1 week later by 5 L _t 's Toxoid	4 months	33	24
Toxin-Toxoid mixture and control = 0.5 L _t followed 1 week later by 5 L _t 's and 3 weeks later by another 5 L _t 's Toxoid	4 months	69	26
Regular Schick followed 1 week later by 5 L _t 's and 3 weeks later by another 5 L _t 's Toxoid	4 months	55	22
Toxin-Toxoid mixture and control = 0.5 L _t followed 1 week later by 5 L _t 's and 3 weeks later another 5 L _t 's and 3 weeks later a third 5 L _t 's Toxoid	4 months	90	29
Regular Schick followed 1 week later by 5 L _t 's, 3 weeks later a second, 3 weeks later a third 5 L _t 's Toxoid	4 months	82	27

TABLE VIII

CORRELATION OF ANTITOXIN CONCENTRATION BEFORE AND AFTER DIFFERENT
ANTIGENIC STIMULI IN ADULTS

Original Schick Reactions	Antigen		Original Antitoxin Values in Units per c.c. of Serum							
			0.001	0.002	0.006	0.010	0.030	0.050	0.075	0.100
Negative	0.1 c.c. Toxin-Toxoid mixture	Mean final antitoxin	1.831	3.750	3.031	.....	3.272	3.700	3.255	4.375
		Mean increase	1.830	3.748	3.025	.....	3.242	3.650	3.180	4.275
		Final A/original A	1.831	1.875	505	.....	109	74	43	44
		Number of cases	8	2	5	0	10	8	7	2
Pseudo	0.1 c.c. Toxin-Toxoid mixture	Mean final antitoxin	0.655	7.500	0.751	3.545	5.080	6.080	2.608	6.250
		Mean increase	0.654	7.498	0.745	3.535	5.050	6.030	2.533	6.150
		Final A/original A	655	3,750	125	353	169	123	35	62
		Number of cases	12	2	1	5	8	7	4	4
Positive	0.1 c.c. Toxin-Toxoid mixture plus 1 dose Toxoid	Mean final antitoxin	0.143	.....	3.755	5.833	.....	5.500	7.500	.....
		Mean increase	0.142	.....	3.749	5.823	.....	7.450	7.425	.....
		Final A/original A	143	.....	626	583	.....	150	100	.....
		Number of cases	18	0	2	3	0	3	1	0
Positive	0.1 c.c. Toxin-Toxoid mixture plus 2 doses Toxoid	Mean final antitoxin	0.515	0.01	.....	.....	3.132	.....	.....	.....
		Mean increase	0.514	0.008	.....	.....	3.103	.....	.....	.....
		Final A/original A	515	5	.....	.....	104	.....	.....	.....
		Number of cases	19	1	0	0	4	0	0	0
Positive	0.1 c.c. Toxin-Toxoid mixture plus 3 doses Toxoid	Mean final antitoxin	0.397	0.750	2.784	0.010	.....	.....	.....	1.250
		Mean increase	0.396	0.748	2.778	.000	.....	.....	.....	1.150
		Final A/original A	397	375	464	1	.....	.....	.....	12.5
		Number of cases	19	1	3	1	0	0	0	1

The significance of the reactions caused by toxin-toxoid mixtures in adults:

Determination of the increase of circulating antitoxin resulting from the different antigenic stimuli gives an additional measure of the response to the intradermal toxin-toxoid injection. In Table VIII is analyzed the relationship between the antitoxin concentration before and after various antigenic stimuli. In Table IX is compared the average increase in antitoxin concentration in the toxin-toxoid procedure with the average increase when the regular

Schick test was used. A definitely larger increase in antitoxin follows the use of the toxin-toxoid mixture. The response as measured by antitoxin increase confirms the response as measured by the Schick test.

It seems noteworthy that the antitoxin response of the Schick negative individuals having less than 0.002 unit of antitoxin originally was far greater than that of the positive reactors with the same scarcity of antitoxin, and that the response of the pseudo reactors fell between these 2 groups (as shown in Table VIII). The fact that the nega-

TABLE IX

COMPARISON OF ANTIGENIC RESPONSE TO THE SCHICK TEST WITH THAT TO THE INTRADERMAL
INJECTION OF TOXIN-TOXOID MIXTURE

		Average	Final Antitoxin	Increase Factor Due to Toxin- Toxoid Mixture
			Original Antitoxin	
Original negatives	Regular Schick		248	
	Toxin-Toxoid mixture		571	2.3
Original positives 1 dose of Toxoid	Regular Schick		129	
	Toxin-Toxoid mixture		237	1.8
2 doses of Toxoid	Regular Schick		201	
	Toxin-Toxoid mixture		426	2.1
3 doses of Toxoid	Regular Schick		161	
	Toxin-Toxoid mixture		373	2.3

tive and pseudo reactors had the greater increase in antitoxin in spite of receiving the least amount of antigen gives further evidence, in addition to their Schick negativity, that their immunologic condition differs from that of Schick positive persons. It seems possible that the explanation for the antitoxin response of the pseudos being somewhat less than that of the negative reactors was that a portion of the pseudos were really combined reactors impossible to differentiate. These individuals would be expected to give the response of a Schick positive person and so lower the average increase of the pseudo group. It is interesting to note that in the negatives a considerable response to the regular Schick test was obtained but that the toxin-toxoid mixture gave a greater stimulus.

When we first considered using a toxin-toxoid mixture as Schick test material it seemed logical to expect that false-positive reactions would occur. We would expect this to result from neutralization of the antitoxin at the site of injection by the toxin and toxoid contained in the mixture, leaving some toxin free to damage the tissue, resulting in a positive reaction. At least a

50-fold increase of antitoxin combining power over that of a regular Schick test due to addition of 0.5 L₁ of toxoid made such a result seem likely. The high percentage of positive reactions from the inadequately controlled injections given in the first hospital mentioned seemed to bear out this theory. We were interested to note that this was not the case in the second hospital where more adequately controlled injections were given. Here there was not a significant increase in false positives (Table X) but only a large increase in the percentage of pseudo reactions, there being 37 per cent of these with the toxin-toxoid mixture as against 13 per cent with the regular Schick test. This group of pseudo reactors invites closer analysis. With the regular Schick test they would have been negative. When combined with the straight negatives as in Table VII the similarity of the percentages with those obtained on alternate individuals with the regular Schick test leaves little doubt of this, yet they are different immunologically. They have a sensitivity to the toxoid which is greater than that of the straight negative individuals and less than those who would be pseudo

TABLE X

COMPARISON OF REACTIONS TO TOXIN-TOXOID INJECTIONS WITH REGULAR SCHICK TEST AS TO DISCREPANCY BETWEEN SCHICK SIZE AND ANTITOXIN CONCENTRATION BEFORE ANTIGENIC STIMULATION

	Kind of Schick and Size of Reactions						Remarks	
	Neg.	Pseudo	Comb.	Positives *				
				1-2	1-3	1-4		Total
Toxin-Toxoid Reactions per cent with less than 0.03 unit...	15	17	59	60	81	100	83	364 persons in the series
Regular Schick Reaction per cent with less than 0.03 unit...	13	13	58	76	92	96	90	559 persons in the series

* The complete Schick reading was represented by two numbers, the first giving the size of the control, the second the size of the test. The symbols represented diameters as follows:

Symbol	Diameter in Millimeters
1	0-9
2	10-19
3	20-34
4	35-44
5	45+

Thus a 1-2 reaction represents a negative control and a 10-19 mm. reaction from the test injection.

reactors with the regular Schick test. According to these results they do not seem to be any more responsive, at least, to the injection of antigen than are the straight negative individuals. The pseudo reactors averaged a 445-fold increase in antitoxin as contrasted with a 571-fold increase for the straight negatives.

The age distribution of the pseudo reactors is shown in Table XI. The marked diminution in the percentage of pseudos in the oldest age group is of interest.

relation between Schick size and antitoxin content shown in these 4 small samples seems to us to be significant. Of course these results may be applicable only to the adult.

This adequately controlled toxin-toxoid mixture seemed to give promise of being a usable Schick test preparation. There were no objectionable reactions and the size of the reactions compared very well with those obtained with regular Schick test material, 67 per cent of the positive reactions being 1-3's with the toxin-toxoid mixture and

TABLE XI

RELATION BETWEEN AGE AND PSEUDO REACTIONS TO TOXIN-TOXOID MIXTURE AND CONTROL

Age Group	No. Persons in Each Age Group	No. of Pseudos	Per Cent of Pseudos Each Age Group	Corrected * Percentage Distribution of Pseudos
15-39	102	37	36.3	37
40-64	210	87	41.4	42
65-89	51	10	19.6	21

* Corrected for variations in size of groups

Is the size of the Schick test any indication of the amount of circulating antitoxin? The results in Table XII indicate that it is. The fact that a 1-2 Schick test is only a 60-70 per cent certain indication that the individual has less than 0.03 unit of antitoxin per c.c. of serum is interesting. This places a 1-2 Schick test in the same category as a combined reaction, which, as in a previous study,⁸ is about as likely to be associated with more than 0.03 unit as it is with less. The approximate cor-

65 per cent with the regular Schick test. It is interesting, however, that the toxin-toxoid mixture used in the first hospital, containing twice as much toxoid (0.5 L_r per 0.1 c.c.) did give undesirable swelling in some instances and too large reactions in many. The age distribution of the reactions with swelling is shown in Table XIII. They seem to parallel the distribution of the pseudo reactions from the controlled preparation containing half as much toxoid in the injection. Here again the oldest

TABLE XII

COMPARISON OF ANTITOXIN CONCENTRATION WITH SIZE OF POSITIVE SCHICK TESTS

	Size of Positives				Total Number in Analysis
	1-2	1-3	1-4	1-5	
Before antigenic stimulation					
P.S.H. and T.C.S.H. pos. to regular Schick tests— per cent under 0.03 unit.....	76	92	96	90	200
P.S.H. pos. to Toxin-Toxoid mixture—per cent under 0.03 unit	60	81	100	100	91
After antigenic stimulation					
P.S.H. pos. to regular Schick test—per cent under 0.03 unit	60	95	100	...	30
T.C.S.H. pos. to regular Schick test—per cent under 0.03 unit	57	100	100	100	29

NOTE: P.S.H. and T.C.S.H. refer to Pontiac and Traverse City State Hospitals respectively.

TABLE XIII

RELATION OF AGE TO REACTIONS WITH SWELLING FROM INTRADERMAL INJECTION OF TOXIN-TOXOID MIXTURES CONTAINING 0.5 L_t PER 0.1 C.C.

Age	No. of Persons in Each Age Group	Reactors in Each Age Group	Per Cent of Each Age Group Reacting	Corrected * Per Cent of Reactors in Each Age Group
15-39	65	18	27.7	44.8
45-64	101	25	25.0	40.4
65-89	33	3	9.1	14.8

* Corrected for variation in size of groups

age group is the least likely to give the sensitivity reaction. How nearly comparable as to age are the groups from the two hospitals is shown by the fact that in one the mean age was 47.6 and the median 46, while in the other the mean was 47.5 and the median 46.

A preliminary study such as this can do little more than determine whether the results merit further investigation. It seems to us that they do. Even if a "single injection" antigen is developed which immunizes 95 per cent of those injected, it will still be desirable to do a Schick re-test as a check on the product used and for the sake of the 5 per cent still susceptible. If this Schick re-test would not only determine the susceptible 5 per cent but would also immunize them it would be valuable.

Although we realize that the important group for immunization is that of preschool age, in which group a pre-Schick is perhaps a waste of time, nevertheless considerable immunization of older children will have to be done for some time to come. The increasing of the circulating antitoxin of the Schick negatives in this group by the use of a toxin-toxoid mixture for the pre-Schick test seems logical, and an increase in the percentage immunized of those subsequently injected with toxoid certainly would be desirable. Another argument for the use of such a preparation is in clinic work. The child who comes for the Schick test and fails to return for a reading and immunizing treatment will have received considerable antigenic stimulation nevertheless.

The comment of those who carried out the study on babies is interesting. They observed no objectionable reactions but preferred to use the toxin-toxoid mixture because on children whose return was delayed for from 10 days to 2 weeks the reactions could still be read.

One of the promising points about the effect of intradermal injection of toxin-toxoid mixtures is the speed with which immunity is attained. The results with preschool children Schick tested 1 month after treatment we feel to be distinctly encouraging.

A final possible advantage to the use of toxin-toxoid mixtures such as described here is that in addition to functioning as an antigen and a Schick test they might serve as a toxoid reaction test as well. This possibility deserves further study.

SUMMARY

The properties of mixtures containing diphtheria toxin diluted to Schick strength in a diluent containing purified toxoid in various concentrations were studied. The following observations were made:

1. Tests on guinea pigs showed that mixtures containing as little as 0.5 L_t per 0.1 c.c. were stable for at least 7 days' incubation at 37.5° C. if 0.05 per cent protone was present in the mixture.

2. Tests for antigenicity on guinea pigs demonstrated that a mixture containing 0.5 L_t per 0.1 c.c. can meet the requirements of the National Institute of Health test for the antigenicity of toxoids if the 0.1 c.c. injection is given intradermally.

3. Studies on immunization of children of preschool age, of children of school age, or of adults, showed that the use of an intradermal injection of a toxin-toxoid mixture in place of the pre-Schick test increased the percentage immunized to Schick negativity by any of the procedures tried.

4. A comparison in adults of the reactions from an intradermal injection of a toxin-toxoid mixture containing 0.25 L_t per 0.1 c.c. with the antitoxin in the blood showed:

a. When a control injection was used with material identical except that the toxin was heated to atoxicity, the reactions were as satisfactory indicators of the blood antitoxin in adults as those from the regular Schick test.

b. The only difference from the regular Schick reactions was an increase in the percentage of pseudo reactions.

c. The effect of the intradermal injections of the toxin-toxoid mixture on immunization to Schick negativity was confirmed by the increase in the blood antitoxin.

5. The age group 65-89 contained a definitely smaller proportion of pseudo reactors to the controlled toxin-toxoid mixture injections than did the age groups 15-39 and 40-64.

REFERENCES

1. Ramon, G. Sur l'immunization antitoxique et la production des antitoxins. Les melanges d'antigene specifique et de substance non specifiques (tapioca, chlorure de calcium). *Ann. de l'Inst. Pasteur*, 47: 339, 1931.
2. Glenny, A. T. Insoluble precipitates in diphtheria and tetanus immunization. *Brit. M. J.*, 2:244, 1930.
3. Jensen, C. Reaction de Schick et taux d'antitoxin chez des enfants vaccines par une injection

unique d'antitoxine diphtherique purifiee et concentree. *Compt. rend. Soc. de Biol.*, 108:543, 1931.

4. Kreitz, Paul B. Immunization against diphtheria with toxoid. *Am. J. Dis. Child.*, 44:1249, 1932.

5. Bunney, W. E., and Tallman, A. W. Diphtheria Studies III. The purification of diphtheria toxoid. In preparation.

6. Glenny, A. T., Pope, C. G., and Waddington, Hilda. The stability of Schick toxin. *J. Path. & Bact.*, 31:133, 1928.

7. Bunney, W. E., and Tallman, A. W. Diphtheria Studies IV. The stabilization of diphtheria toxin for use in the Schick test. In preparation.

8. Young, C. C., Bunney, W. E., Crooks, Minna, Cummings, G. D., and Forsbeck, F. C., Diphtheria Studies I. The significance of the Schick test in the adult. *A.J.P.H.*, 24:835, 1934.

9. Bunney, W. E., and White, Benjamin. Advantages and disadvantages of the buffered diluent for diphtheria toxin. *J. Immunol.*, 20:61, 1931.

NOTE: Our thanks are due:

Dr. C. C. Young for the preliminary tests on medical students.

Drs. Charles F. Church and Rae V. Nicholas of the Department for Prevention of Disease, Children's Hospital of Philadelphia, for the studies on infants of preschool age.

Dr. Edmund A. Christian, Medical Superintendent of Pontiac State Hospital and Dr. R. Phillip Sheets, Medical Superintendent of Traverse City State Hospital, for their coöperation and assistance in the studies on adults.

Dr. John D. Monroe and Dr. V. K. Volk of the Oakland County Department of Health, Pontiac, Michigan, for the studies on free living children of school age.

Minna Crooks, G. D. Cummings, and F. C. Forsbeck for assistance in the studies on adults.

J. W. Glassen, H. C. Hollon, H. Kibbe, and A. W. Tallman for assistance in the blood titrations in the studies on adults.

The 1934 Health Conservation Contests

THE Awards for the sixth annual City Health Conservation Contest and for the first Rural Health Conservation Contest were announced by the Chamber of Commerce of the United States at its Annual Meeting in Washington on April 29. Both Contests are conducted by the Chamber of Commerce of the United States in coöperation with the American Public Health Association. The Contest for cities is financed by a group of insurance companies and one philanthropic organization. It is open to any city anywhere in the United States, provided it has a local chamber of commerce or similar organization having affiliation with the Chamber of Commerce of the United States.

The Contest for counties or districts is supported by the W. K. Kellogg Foundation of Battle Creek, Mich. It is open to any county or district with full-time health service, provided it has a local chamber of commerce or similar organization having affiliation with the Chamber of Commerce of the United States.

Together the Contests had enrollment in 1934 from 45 states, the Islands of Hawaii, and Alaska. In all, 214 cities and 104 counties or health districts were entered embracing a population of between 29 and 30 million people.

The City Contest is in effect 6 contests, 1 for each of 6 population groups ranging from cities of over 500,000 population to those of under 20,000 population. One first award and as many honorable mentions as scores justify are given in each group. In the City Contest, there is also a Special Group composed of cities which have twice won the Contest in their respec-

tive population groups and have for this reason been excluded from the contest proper. Special Awards were given to those of this group which maintained their previous high standards during 1934. For 1934, there were 35 awards in the Contest proper and 5 special awards.

For purposes of the Rural Contest the country has been divided into 6 geographical areas, 3 east and 3 west of the Mississippi. These are:

Northeastern: Connecticut, Illinois, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont and Wisconsin.

Eastern: Delaware, Kentucky, Maryland, North Carolina, Tennessee, Virginia and West Virginia.

Southeastern: Alabama, Florida, Georgia, Mississippi, and South Carolina.

North Central: Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota and Wyoming.

South Central: Arkansas, Louisiana, New Mexico, Oklahoma and Texas.

Western: Arizona, California, Idaho, Nevada, Oregon, Utah and Washington.

One first prize and as many honorable mention awards as scores justify are given in each geographical division.

CITY CONTEST AWARDS

The awards for the 1934 City Health Conservation Contest are:

For the largest cities of *over 500,000* population, the first award goes to Baltimore, Md., and honorable mention to Buffalo, N. Y.

In cities of *between 250,000 and 500,000* population, Newark, N. J., attains the first award, and honorable mention goes to Minneapolis, Minn., Toledo, Ohio, and Dallas, Tex.

In cities *between 100,000 and 250,-*

000 population, Honolulu, Hawaii, wins first place, and honorable mention goes to Hartford, Conn., Grand Rapids, Mich., Springfield, Mass., Duluth, Minn., Yonkers, N. Y., Reading, Pa., and Utica, N. Y.

In cities of between 50,000 and 100,000 population, Pasadena, Calif., receives the first award, and honorable mention goes to Kalamazoo, Mich., Schenectady, N. Y., Evanston, Ill., Waterbury, Conn., Sacramento, Calif., Binghamton, N. Y., San José, Calif., New Rochelle, N. Y., and Greensboro, N. C.

In cities of between 20,000 and 50,000 population, the winner is Hackensack, N. J., and honorable mention goes to Watertown, N. Y., Pittsfield, Mass., Auburn, N. Y., Greenwich, Conn., and Santa Barbara, Calif.

In cities under 20,000 population, Palo Alto, Calif., obtains the first prize, and honorable mention goes to Englewood, N. J., Cliffside Park, N. J., Hibbing, Minn., and Miami Beach, Fla.

Special Awards were granted to Brookline, Mass., Detroit, Mich., Milwaukee, Wis., New Haven, Conn., and Syracuse, N. Y.

RURAL CONTEST AWARDS

The awards for the 1934, the first Rural Health Conservation Contest, are as follows:

In the *Northeastern Division* two first places are awarded to Cattaraugus Co., N. Y., and Westchester Co., N. Y.; honorable mention goes to Columbia County, N. Y., Barry Co., Mich., Southern Berkshire District, Mass., Allegan Co., Mich., and Eaton Co., Mich.

In the *Eastern Division* first place goes to Kent County, Md., and honorable mention to Davidson Co., Tenn., Ohio Co., W. Va., Rutherford Co., Tenn., Washington Co., Md., Forsyth Co., N. C., and Sullivan Co., Tenn.

In the *Southeastern Division* first

prize is won by Glynn Co., Ga., and honorable mention goes to Charleston Co., S. C., Lauderdale Co., Miss., Pike Co., Miss., and Leon Co., Fla.

In the *North Central Division* first place is awarded to Woodbury Co., Iowa, and honorable mention to Lyon Co., Kans.

In the *South Central Division*, the winner is El Paso Co., Tex.

In the *Western Division* first prize is awarded to San Joaquin Health District, Calif., and honorable mention is attained by Los Angeles Co., Calif., Santa Barbara Co., Calif., Spokane Co., Wash., and Yakima Co., Wash.

SIXTY-EIGHT AWARDS GIVEN

Between the City Contest, the Special Awards, and the Rural Contest, there were 68 awards given. In all 25 states were represented in these awards. New York led all the states with 12 awards; California came next with 8; followed by Michigan with 6. Connecticut, Massachusetts, and New Jersey had 4 each; and Maryland, Minnesota, and Tennessee had 3 each. Two awards each went to Florida, Mississippi, North Carolina, Texas, and Washington. Georgia, Hawaii, Iowa, Illinois, Kansas, New Mexico, Ohio, South Carolina, Pennsylvania, West Virginia, and Wisconsin each received one award.

Including the Special Awards for cities which had won the City Contest twice, there were 17 first prizes. Among the first awards, California led with 3, followed by Maryland, New Jersey, and New York with 2 each. Georgia, Hawaii, Iowa, Massachusetts, Michigan, Connecticut, Texas, and Wisconsin each received 1 first prize.

FREE HEALTH SURVEYS

The purpose of these Contests is to promote basically sound public health work in this country to the end that untimely and premature deaths shall be

eliminated and economic losses from unnecessary illness reduced to a minimum. It is hoped that Contests will accomplish this purpose by enlisting the active intelligent interest of business men in the value of public health as an asset and by stimulating a more unified and better coördinated program on the part of the various groups and organizations interested or engaged in the protection and promotion of the public health.

It is believed that every unit city or county entered on the Contests derives benefit from its participation whether it wins or even attains a high score. The Contests assist every participant in that:

1. They provide an opportunity for a self-appraisal of the community's public health program.

2. The backing and intelligent interest of a well formulated Public Health Committee of the Chamber of Commerce results in increased public health interest and knowledge of sound public health work.

3. The fact that these are community-wide rather than health department contests is conducive to obtaining a more complete picture of public health facilities and programs than might otherwise be obtained.

4. The incentive of the Contests being a competition in which all interested organizations and groups participate, generally results in a more unified community interest and, therefore, in a better coördination and integration of the work of the various groups interested and engaged in public health work.

5. They foster a spirit of coöperation between the public health workers and the medical and dental professions in that specific credit is given for preventive work done by private physicians and dentists.

6. The Contests provide useful publicity in that the results of the analysis of the information submitted call attention to the strong features of the community's public health program and likewise point out its apparent needs. (These analyses are sent only to the health officers and chambers of commerce secretaries, and any public use of these is made by them.)

That the Health Conservation Contests are thought of real value by outstanding people in the field of public health is attested to by the following comments:

Dr. W. S. Rankin, a Director of the Duke Foundation and former Commissioner of Health of the State of North Carolina said: "It is my opinion that these annual health conservation contests have already done more to promote basically sound public health work in this country than anything which has happened during the past decade."

T. F. Cunneen, Manager of the Insurance Department of the Chamber of Commerce of the United States, said: "It is particularly gratifying to realize that over 3,000 business men have, through these contests, become actively identified in promoting public health protection as a business and economic asset. This important interest should prove of ever-increasing value to the future health of our people. Insurance companies recognizing the value of sound health promotion have been largely responsible for the financing of the city contests."

Dr. A. J. Chesley, Commissioner of Health of the State of Minnesota, said: "These health contests provide the most effective means available anywhere for bringing public health problems and the need for their solution forcibly to public attention, particularly locally."

Dr. C.-E. A. Winslow, Professor of Public Health at Yale, said: "A very significant index that the health conservation contests are accomplishing their purpose is the fact that over 90 per cent of all those cities competing for two or more years have shown appreciable advances in their public health practices and records."

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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THE MALARIA EPIDEMIC IN CEYLON

DURING several months there have been repeated notices in the daily press of an epidemic of malaria in Ceylon of unusual severity. It has also been commented on in a number of scientific journals. Recently what appear to be reliable reports have reached us.¹

No authentic information of the number of deaths from malaria during this epidemic is available, though it is believed that from November, 1934, to January, 1935, more than 30,000 have occurred. In January, 1935, 5,468 of the 7,038 victims were children under 14. In about two-thirds of the area of the Island, conditions are favorable to the breeding of anopheles. Here the endemicity is high and the spleen rate runs from 40 to 60 per cent, and even rates of 80-90 per cent occur. There is considerable relative immunity, and epidemics of malaria do not occur. In the healthful part of the Island, about one-third of the area, the rains failed to supply the usual amount of water, which varies from 100 to 200 inches a year, giving an abundant flow which flushes the channels and prevents the formation of quiet pools favorable for mosquito breeding. In 1933, the rains failed, leaving many pools suitable for the development of mosquitoes in the beds of streams in the healthful third of the island. The inhabitants, having very little acquired immunity, became an easy prey to the malaria carrying mosquito, *Anopheles culicifacies*. This hitherto healthy area has felt the full force of the epidemic.

The death rate is rather hard to understand, since it is stated, on the basis of earlier surveys, that 57 per cent of the cases are benign tertian, 33 per cent quartan, and 10 per cent malignant tertian.

The failure of the rains already mentioned produced a drought which greatly reduced the food supply, and undernourishment was quite widespread; in fact, many of the population were on the verge of starvation. In India it is known

that famine almost invariably predisposes to epidemic conditions, so much so that in the Punjab and in Bengal, climatic conditions which are known to precede a famine usually are used by malariologists as an indicator in selecting the areas in which quinine treatment should be concentrated.

In spite of the high morbidity and high mortality there does not seem to be anything remarkable when judged by the standards of that part of the world. Epidemic outbreaks in India are usually accompanied by a fatality of 20 to 35 per cent. The area of Ceylon in which the epidemic is said to have been worst, has a population of approximately $3\frac{1}{2}$ million. There have been 500,000 cases, with 60,000 deaths, a fatality rate of 12 per cent, which is lower than one might expect. The normal fatality rate in India is 5 per cent, and therefore there seems no good reason for the excitement which the present outbreak has occasioned.

It has been suggested that a new type of the malarial parasite has been responsible. The daily press has spoken of "green germ" malaria, and *Science News Letter*, for February 16, 1935, has commented upon this. There does not seem to be any good ground for this supposition; certainly none, if the figures collected for the three known types of malaria can be accepted, as it at present seems they should be.

There is a lesson for us, however, in this outbreak. In spite of recent supposedly authentic statements to the contrary,³ malaria is very far from having been banished from our own country, much less from the world in general. For approximately 70 years the trend in the United States has been downward, with some fluctuations. During the summer of 1934, there was a very sharp rise with reinvasions of portions of territory formerly malarious but which were believed to have been cleaned up. In these areas an increase of virulence was noticed following the rule of most contagious diseases when invading new territory. In 1934 the rate reached a higher stage than at any time during the last 20 years, and appeared in 3 states which have been at the northern limits of endemic malaria, and in one which has been outside of the malaria district for 10 years. Indeed, in one instance an outbreak occurred in a northern state where malaria had never been reported before.⁴ It is for these reasons that the work of the CWA in ditching and drainage have been of such value to the country.

REFERENCES

1. *Brit. M. J.*, Feb. 2, 1935, p. 209.
2. *J.A.M.A.*, Mar. 9, 1935, pp. 845-846.
3. *Hygeia*, Dec., 1934.
4. *A.J.P.H.*, Jan., 1935, pp. 11-14.

TUBERCULOUS INFECTION OF NURSES AND MEDICAL STUDENTS

IN spite of the fact that many of our universities and schools now have organized health services and require a physical examination of students before entrance, tuberculosis still takes its toll, and the evidence seems fairly clear that quite a number of students are infected during attendance. This is especially true of medical schools and schools for nursing. A review of the matter, especially in regard to nurses, is given by the *J.A.M.A.*,¹ from which we take a number of facts.

In 1933, Heimbeck, of Oslo, gave the result of several years of observation in the Ulleval Hospital. On entrance, approximately 50 per cent of the girls who

entered as probationers were negative to the tuberculin test, but before graduation all reacted positively, demonstrating that infection had occurred during their duties. Heimbeck was able to observe the time when the negative reactors became positive. An attempt was made to determine the focus of infection, though in the majority of cases it escaped detection, while in others it was in the lung. Some cases were evidently reinfection, the students having gone through their preliminary manifestations before they entered the hospital.

In St. Paul, Geer showed that from 60 to 75 per cent of the probationers in the Ancker Hospital had not been infected on entrance, but all reacted positively to tuberculin after a tuberculosis service and before graduation. In approximately 5 per cent, pleurisy with effusion occurred or other lesions were demonstrated.

In 1934, Myers, Diehl, and Lees showed that of the probationers in hospitals in Minneapolis, from 13 to 40 per cent react positively to tuberculin, while in those hospitals which require tuberculosis service, approximately 100 per cent react positively during the senior year. In other schools where there is no tuberculosis service and only occasional cases of the disease are admitted, there is still a definite increase in the incidence of positive reactors among the nurses, but it is not nearly so marked as in those schools in which tuberculosis nursing is required. A comparison of schools of nursing with schools of education showed that in the latter only 23 per cent of the entering students reacted positively, whereas after 4 years there had been only a 4 per cent increase in the positive reactors. In other words, 27 per cent reacted positively to tuberculin on graduation in the school of education against 100 per cent in the school of nursing.

In 1933, Shipman and Davis published their results after nearly 10 years of observation among students of nursing. They found that between 6 and 7 per cent of the students at the University of California Hospital developed clinical tuberculosis during training, while an additional 4 per cent developed the disease between graduation and the time the study was reported. The majority of nurses who reacted negatively as probationists remained negative through training, a fact which they attribute to the very small number of tuberculous patients in the hospital.

In 1930, Ross demonstrated that about 6 per cent of the nurses in Manitoba fell ill with tuberculosis during their training or within a year after graduation, and this figure is much greater than the proportion in which women in the Province in general, or any other class, show tuberculosis.

In New Zealand, Jones has shown that approximately 3 per cent of the girls in training fall ill each year. In teacher training colleges he found very little tuberculosis and concluded that girls from 19 to 25 remain in excellent health when subjected to healthful conditions, but when exposed to cases of tuberculosis, all became positive reactors to tuberculin and 3 per cent developed tuberculosis.

In Saskatchewan, Ferguson has shown that the incidence of tuberculosis among nurses in training is 12 times that found among the general population and 8 times that found among normal school students of approximately the same age.

A study² covering 8 years, during which 300 medical students and 380 nurses at the Boucicault Hospital were examined with the idea of weeding out the unfit as early as possible, showed that among the 300 students there was only 1 case of pulmonary tuberculosis with bacilli in the sputum, while 5 others showed unmistakable signs of having had pleurisy, and 6 others showed radiological

abnormalities some of which proved to be tuberculous. The 380 nurses had already undergone a comb-out but in spite of that, 1 case of pulmonary tuberculosis with bacilli in the sputum, and 1 of old pleurisy were found, while 6 other nurses showed some abnormality of the lung. The authors have been struck by the development of tuberculosis in persons who seemed perfectly well at the first examination. Suspecting that they were primary infections, during the last 2 years they included tuberculin skin tests in their routine examinations. Among the students 37 of 48, and among the nurses 161 of 205 gave positive reactions. Most of the negative reactors were town dwellers, and only 2 students and 10 nurses who were negative had homes in the country. In the course of the following 8 months, 7 of 9 negative reactors became positive and 4 of them showed other signs of tuberculosis. The authors wondered how these results could be correlated with those of Hamburger and Monti in Vienna, where 94 per cent of the children between 11 and 14 gave positive reactions. They believe that it was due to differences in the surroundings and to the effect of the antituberculosis measures at present. They concluded that their results prove that primary infections of young adults is common and that the onset may be sudden and even violent.

In commenting on this paper, Bezançon held that these observations tended to refute the idea that tuberculosis is a hereditary disease, an idea which, in France at least, seems to be again coming into fashion.

The review¹ referred to goes into the difference between first infection and reinfection to a considerable extent, and points out that the type of tuberculosis seen among the student nurses belongs to that formerly prevalent among children, but owing to antituberculosis measures, is now escaped by many who reach adult life free from tuberculous infection. When later they become infected, as many students of nursing do, the result is very much the same as that shown in childhood during the first infection. A curious result in a number of cases is the development of erythema nodosum, which is now regarded as an allergic manifestation which should always lead to looking for a tuberculous first infection type. In the majority of such cases there is no external manifestation except the positive reaction. Only recently has the close association between this condition and the first infection type of tuberculosis been recognized. It is probably due to a high degree of allergy.

After the first infection type of tuberculosis has produced an allergic reaction there is no way of determining how much additional infection occurs. It may be concluded therefore that if all the uncontaminated students become infected during training those who are already contaminated when they enter are reinfected. Tubercle bacilli are not rapidly destroyed in the body and may survive over long periods and eventually produce tuberculosis which becomes evident years after graduation. Shipman and Davis state that most of the nurses who developed clinical tuberculosis during training reacted positively on entrance.

After many pathological examinations, Sweany suggests that nature may defeat her purpose when she encapsulates bacilli and in later years reabsorbs the capsule, setting the tubercle bacilli free. This seems a fair explanation of some cases of tuberculosis in which the immediate origin is not clear.

To all of those who believe, as many have done and still do, that practically all tuberculous infection takes place in childhood, these recent studies give pause. However, they have brought about good results in that a greater number of examinations are being made and that more care is taken of students in our

schools. The study of Myers running over a number of years in which cases have been followed from childhood infection to adult tuberculosis are extremely suggestive. His results give a negative answer to our ideas that early tuberculous infection has a vaccinating effect and protects against adult tuberculosis.

REFERENCES

1. *J.A.M.A.*, Dec. 22, 1934, pp. 1968-1969.
 2. *Bull. Hyg.*, Dec., 1934, pp. 818-819.
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SIXTH ANNUAL MEETING, WESTERN BRANCH A.P.H.A. HELENA, MONT., JULY 1-3

AT the Sixth Annual Meeting of the Western Branch of the American Public Health Association, public health matters of special interest to the West will be discussed, and a program of unusual value is being arranged by Dr. W. F. Cogswell, State Health Officer of Montana, President-Elect of the Western Branch, and Chairman of the Committee on Meetings and Publications.

Public health problems among western Indians; peculiarities of western water and sewage disposal systems; new plans for public health developments by the federal government; latest advances in the control of Rocky Mountain spotted fever, undulant fever, tularemia, silicosis, psittacosis; home nursing of communicable diseases; various aspects of tuberculosis; and modern advances in health education are among the subjects to be discussed. Among the distinguished guests expected are Katherine Lenroot, U. S. Children's Bureau; Josephine Roche, Third Assistant Secretary of the Treasury; Dr. Thomas R. Crowder, Chief Surgeon of the Pullman Company; Dr. A. J. Chesley, State Health Officer of Minnesota; Dr. Thomas A. Parran, Health Commissioner of New York; Dr. E. L. Bishop, Medical Director of the Tennessee Valley Authority; Helen LaMalle, Superintendent of Nursing, Metropolitan Life Insurance Company, New York City; and others.

The meeting will be held in conjunction with the annual meeting of the Montana State Medical Association.

W. P. S.

THE OPEN FORUM

REGINALD M. ATWATER, M.D.

Executive Secretary, American Public Health Association

THROUGH the courtesy of the Editor of the *Journal* and the Chairman of the Committee on Meetings and Publications, this space has been set aside for the use of the Executive Secretary. Dr. Atwater intends from time to time to communicate with the membership through this page and to bring to their attention affairs which are of importance to the professional public health workers of North America.

It is also intended that questions of general interest, from among the many received by the Association office, will be answered through these columns, and opportunity afforded for the expression of opinion pro and con among the readers of the *Journal*. The Executive Secretary will welcome suggestions of timely subjects for discussion here and will make use of the wide and distinguished membership of the Association for counsel in connection with the Forum material.

THE SOCIAL SECURITY BILL

ARE you familiar with the provisions of the Bill as now before the House of Representatives (H.R. 7260)? This bill differs in several respects from previous drafts, and it is worth study. The provision for unemployment and for old age security represent very substantial efforts in these directions. They provide for this load to be undertaken gradually by the public, and eventually to be shared by the employer and employee on a basis which is said to be sound from the actuarial viewpoint and in line with the opinions of many

advocates of these social safeguards who have studied the subject for years.

It is encouraging to note that the provisions for expansion of the federal public health service, for aid to states in maternal and child health and for crippled children are among the portions of the Bill toward which Congress at this time seems most favorably inclined. There are signs which indicate that the principle of federal aid to states for these purposes is now rather well accepted.

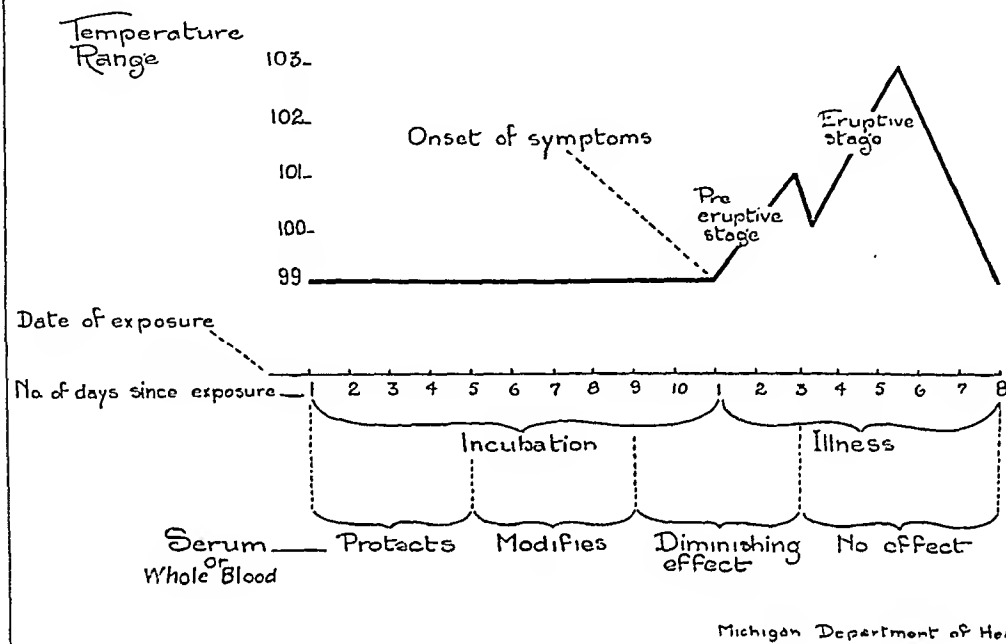
Although it remains to be seen whether this Social Security Bill can pass in its omnibus form at the present session, there are many indications that a new attitude toward federal responsibility is abroad, and it is well to think through the implications of this Bill for each locality so that, if it does become effective, adequate local provisions may be already under way.

MEASLES PREVENTION

THERE has come to the attention of the Executive Secretary a chart published in 1935 by the Michigan State Department of Health on measles prevention. Believing that many health officers will welcome such a clear and simple illustration of a rather complex affair, the chart is republished herewith by kind permission of Dr. C. C. Young.

If parental blood or immune serum is to be useful in actually reducing measles mortality, experience indicates that the practising physician needs encouragement and information on the technic of administration. The use-

USUAL COURSE OF MEASLES



fulness of such immune serum is greatly affected by the time at which it is given. The chart has been designed to make it easy for the busy practitioner to choose a date for this procedure so that it will be most useful to the child whom he desires to protect.

In view of the limited effectiveness of all our measles measures, is it not incumbent on health officers to make the really dependable procedures as simple and clear for the physician as possible?

HEALTH OFFICERS' INSTITUTE

THE suggestion has been made that at some future Annual Meeting there should be set up an Institute for Health Officers at which some competent instruction may be offered on such matters as planning the program, making up the budget, selecting personnel, and balancing the effort most intelligently—matters of great importance to all health officers, and especially to young workers in the field

who may profit by the accumulated experience of those who know how.

A somewhat similar Institute has been held for several years for workers in health education, and those who attend the three day sessions preceding the Annual Meeting can testify to the value of the Health Education Institute. What do you think? Do you recommend this matter for consideration by the Health Officers Section? If there is sentiment in favor, it may be discussed in this space again.

EPIGRAMS

WHAT are your favorite epigrams on health? Believing that there is room for more and that a collection of good quotations would be helpful to many workers in the field, it is intended to carry such epigrams in this column. Send in your own list.

"In nothing do men more nearly approach the gods than in giving health to mankind."—Cicero

PUBLIC HEALTH EDUCATION *

We Are Corrected—Most important is a letter from Norah March, editor of *Mother and Child*, London, which periodical was quoted in the April issue, under "Flamboyant and Not Polite" (page 490) as seeming to be critical of health education methods in the United States. Miss March says:

May we protest that we do not wish to express dislike of Public Health Education methods in the United States, but rather admiration! I only wish we could apply them here!

The American Dietetic Assn., mentioned under "Exhibit of Food Fads and Fallacies" (page 492), should now be addressed at 185 N. Wabash Ave., Chicago, Ill.

Education By Radio, as issued, will be sent free by National Committee on Education By Radio, 1201 16th St., Washington, D. C. (under "Radio," page 495).

Illinois Dept. of Public Health, Springfield, will be glad to supply copies of radio talks (under "Radio," page 496).

Motion Pictures at Milwaukee—It is probable that the space at Milwaukee will enable us to show health pictures. What have you in 16 mm.?

Syphilis Is News in New York State—Back in December Horace H. Hughes of State Committee on Tuberculosis and Public Health, S.C.A.A., New York, N. Y., prepared an office memorandum from which we quote:

The newspapers in New York State are beginning to shoulder their responsibility for the publication of news about syphilis control. During the past year our State Committee has a record of 50 papers which have printed one or more stories using either the word "syphilis," or venereal disease. In some of these papers, such as the *Utica Press*, and the *Syracuse Post-Standard*, the word "syphilis" has been printed in their headlines and as captions for photographs.

A large number of papers in the above list published only the story regarding Dr. Parran's resignation from the Public Health Committee of the National Advisory Council on Radio in Education, following the barring of a radio talk which he was scheduled to make, unless he removed all mention of syphilis from the manuscript. This is proof that if the syphilis news can be made emphatic enough and yet handled in a discreet manner, there is no reason why it should not be published by a great majority of papers in the state.

During the past 2 weeks I wrote to our executive secretaries in Niagara, Oneida, Onondaga, and Schenectady Counties and to Paul Benjamin in Buffalo—these are the places where the newspapers have not been averse to regular publication of syphilis news. I asked them to find out if their local editors had received any complaints from the readers of these newspapers on the publication of syphilis news. Replies have been received from all but Mr. Benjamin and all report that no objections have been recorded.

I also inquired from Mr. Greenman in Rochester whether there had been any objections from listeners-in over Station WHAM where a broadcast was made by Dr. Joseph Earle Moore on "Syphilis in Marriage." The reply again was negative.

These facts are conclusive evidence that the public is not greatly shocked or perturbed over the publication of this type of material. Editors and radio program directors have steadily maintained that such was the case.

I am, therefore, convinced that when the editors of the state are fully acquainted with the facts about the menace of syphilis, with the need for calling this menace to the attention of the people, we can break down among the newspapers, the so-called "conspiracy of silence."

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Do They Mention Syphilis?—Do newspapers in your state or city ever mention syphilis or venereal diseases? Do broadcasting stations allow mention of the same?

Good use can be made of any information you may send to the editor of this department. Please send all clippings or specific information. If your information is incomplete please check details and send them as early as possible.

In April, 1935, *Journal*—This issue contained various references to health education.

In "Clinical Amebiasis in Relation to Public Health" (page 403):

The old struggle to develop a sanitary sense in the general public must go along with the education of physicians. A popular demand for clean food, clean dishes and utensils, clean kitchens, clean waiters and other food handlers, safe water supplies, absence of flies and insects where food is handled, clean hands and fingers, and the availability and enforced use of sanitary toilets and wash-bowls—such a demand would go far to control the amebiasis problem and with it many other related problems. . . .

This program should consist of (1) education of physicians, (2) education of the public. . . .

In "Potential Problems of Industrial Hygiene in a Typical Industrial Area" (page 423):

In order to acquaint industry, the medical profession, and others interested in such a program, it may be necessary that the personnel carry on an educational campaign, designed to instruct and interest the various groups involved, as to the importance of the problem, in an effort to further the program.

In "The City Health Officer Looks at Diphtheria Prevention" (page 425) see description of a movie talkie trailer, and other paragraphs.

In "Occupational Hazards in the Agricultural Industries" (page 462):

Every state board of health, workmen's compensation commission, state and agricultural college, farm advisory board, etc., should

use its offices and bulletins to spread information concerning the methods by which the occupational hazards of the agriculturist may be decreased.

In "Generalized Public Health Nursing Service in Cities" (page 478):

The rôle of the adequately prepared and supervised public health nurse as the interpreter of scientific knowledge in performing family health service under the direction of a generalized public health nursing agency should be of great assistance toward attaining the goals of preventive medicine and public health.

"A Selected Public Health Bibliography With Annotations" (page 515) is the concealing title of material in every issue to be read carefully for source material, leads for timely topics, for titles. Note "While Colds Go Merrily On," title of comment on a medical journal article on "The Common Cold."

"Too Much Pathology?"—A committee of Social Work Publicity Council, looking over some health education material, asked one of its number to comment on a series of weekly releases from a state health department. Here is the result:

This is a worthy effort at health education that should be emulated by state and local health departments throughout the country. As a weekly newspaper release it is a great advance over the limited distribution of weekly or monthly health department bulletins. And emanating, as it does, from an official health source, it has considerably more value, it seems to me, than the average syndicated health column conducted by the individual physician. Better still would be a column, signed or unsigned, to which various health authorities in the state might contribute, under the aegis of the state health department. My point is that such a column representing group thinking and sanctioned by the state health authority would carry more weight and be apt to be sounder, on the whole, than the usual syndicated article which represents only the knowledge, opinion and point of view of the individual writing the column.

The only question as to the series of

articles under consideration is their merit from a journalistic standpoint. They are instructive, clear and even interesting—a good, honest, and solid piece of health education work, but could be more vigorous, stimulating and colorful. They lack a certain “punch” and need more emotional appeal. They sound a bit text-bookish, go too much into the pathology of the diseases they discuss, and are too detailed in their exposition of immunity tests and immunizing procedures. The vocabulary is heavy in spots.—Paul Komora.

Does this comment offer a tentative yard stick for testing our own output?

Health Education in Saskatchewan—A program of education and publicity is outlined in “Activities in a Province-wide Programme for the Control of Tuberculosis,” by R. G. Ferguson, in *Canadian Public Health Journal*, 105 Bond St., Toronto 2, Ont. March, 1935. 35 cents. Says Dr. Ferguson:

However fundamental the facilities for treatment, diagnosis, and follow-up care, of equal importance and much more difficult of attainment is the education of the mass of the people. To the extent that the public are convinced that tuberculosis is curable and preventable, just so far will they avail themselves of facilities for its early diagnosis and care, and will they be willing to pay for the cost of maintaining the programme for its control and eradication.

Dramatization by Girls—In the April, 1935, *Guardian*, Camp Fire Girls, 41 Union Square, New York, N. Y., “Promoting Interest in Health” suggests use of their “Health Chart.”

They will enjoy working out their own dramatization of the points of the chart, presenting brief plays and skits with the health idea for the theme. A few suggestions for such skits are: History of Health Through the Ages, Making Our Own Health Insurance, and How the Doctor Gives a Health Exam.

Care should be exercised in the choice of material for these skits. Be sure the facts are true, worthwhile, up-to-date, and sufficiently interesting to hold the attention of the girls. Such statements as “If you drink coffee you

will not grow up to be a strong healthy woman” should be avoided. Someone will immediately say “Mrs. Smith drank coffee all her life and she is as strong and healthy as anyone in this town.” Make it clear that Mrs. Smith is strong and healthy in spite of having drunk coffee because of her fine healthful heritage and that not all of us are fortunate enough to have had such sturdy, healthy parents and grandparents as Mrs. Smith.

Fads and Superstitions—A fad is said to be “a hobby; freak; whim.” One phase of superstition is “an excessive reverence for, or fear of, the unknown or mysterious.” Both definitions seem to apply to situations met in health education. Attacking those situations expressed in beliefs or emotions may get attention for sound health ideas and information.

“Facts for Food Faddists” in *Consumer's Guide*, Consumer's Council, A.A.A., Washington, D. C. March 25, 1935. Free. Includes paragraphs on acid fruits and milk, roughage, ice cream and sea food, protein and starches, iron in raisins, etc. Food fads

... can be expensive when you are trying to make your food money go far. Getting rid of fads that are false, foolish, or half true may help you plan, buy, and prepare your food more economically.

“Food Fads and Fallacies Relating to Milk.” *Dairy Council Digest*, National Dairy Council, Chicago, Ill. Feb., 1935, gives more detail on some of the points mentioned above.

And Montreal Comes Next—The National Conference of Social Work meets next in Montreal, June 9–16, 1935.

In addition to sessions on social security and other topics, there will be gatherings of health workers, and national health agencies will be represented at Consultation Center, the headquarters grouping of both Canadian and United States national welfare and

health agencies. This will afford opportunities for examining publications and meeting leaders and specialists.

The Social Work Publicity Council will have an extensive display and technical sessions of interest to health workers.

For program information address the National Conference, 82 North High St., Columbus, Ohio.

Milwaukee in October—The Scientific Exhibits should be bigger and better since the idea is getting understood more generally.

The Public Health Education Section will have an interesting and profitable program.

Public Health Education Headquarters will offer a wealth of materials on a wide range of methods and problems.

It is hoped that there will be a modest projection hall for motion pictures and other presentations.

And we will have a chance to meet those in the Health Department and the Wisconsin Anti-Tuberculosis Association who have such a long and interesting record of work in health education.

Regional Round Tables—Staff members of the National Organization for Public Health Nursing are offered for regional groups for the study of administrative and technical problems. Says *Listening In*:

The regional round tables will be tried out in a few selected localities this spring, and in the fall we will be ready to arrange, as far as staff personnel will stretch, to conduct regional round tables at the request of local groups on questions especially related to organization and administration aspects of your jobs in contradistinction to institutes on any one subject. This does not mean that we would not touch on the content of programs or such practical questions as to how to keep records and statistics, but we would not attempt through such round tables to handle just one subject. The discussion rather than

the lecture method will be used so that the group itself will participate and thereby gain from a pooling of experience.

The round tables may be divided into sessions for executives (including supervisors), field nurses, board members—official, non-official—rural or urban, large or small agencies, as seem to fit your need. They might cover from 1 to 3 days with a special time allotment for each group. The N.O.P.H.N. staff member would be available throughout the time when not in conference, for individual interviews. It is hoped that the area covered by these round tables will be fairly large to insure attendance of 30 or 40 people and a widely representative number of agencies. A small fee, maybe 50 cents per person, for any or all of the sessions will be charged to help meet incidental local expenses.

There are a lot of hopeful possibilities in this method in the public health field. Of course we are particularly interested in its application to adult health education.

There might be great gain in getting together representatives from public and private agencies, including the non-health groups doing something in health education in their own constituencies. The editor of this department would like to learn of any who are interested in this idea.

Milwaukee's Report to the Public—"Milwaukee's Health" and "1934" near the top of the cover page of greenish gray, heavy paper; text on fairly heavy rough finished paper; a center spread of 4 pages of full-page photographs that "bleed" on all four sides and the following text made up the Milwaukee, Wis., Health Dept. report:

Health Conservation Contest certificate; Executive Staff; Favorable Health Criteria (2 of them); Some Reasons for the Above Results (one of the 6 is "Accumulative effect of educational measures"); Unfavorable Results (2 of these), with 3 Explanations; Miscellaneous Achievements; General Information; Immediate Needs; Costs (6 items); Comparative Health Statistics (cities over 500,000); a page of Vital Statistics; a page on

Health Department Service to the Community, 1934 (recorded statistically); a page of Expenditures; a page organization diagram.

The Public Seeks the Easy Way—The public always wants to believe in an easy way—a direct method—a *sure* cure. Referring to a recent announcement of some experimental work *The Chaser*, State Tuberculosis Sanatorium, Sanatorium, Texas, says:

It would be a Godsend should the experiment prove satisfactory, but let us not lose sight of the fact that we already know how to prevent and cure tuberculosis. To accomplish this end requires a little more effort than the average person cares to put forth. We, the public, would like to have a vaccine or "shot in the arm" that would immunize us against tuberculosis. Then our troubles and worries would be over. But this so-called vaccine is not available and until it is, let us not drop our hands in our laps in disgust. Let us acquire the knowledge that science has to offer to prevent the spread of this insidious disease and use it in a continuous program for the eradication of tuberculosis. Should such a program be carefully carried out in each community we should soon forget the vaccine idea, for it really would be unnecessary to our health and to the future health of our children.

Copies of what any one has said or has printed to meet such situations would be welcomed by the editor.

Dr. Kleinschmidt Is Abroad—Through the courtesy of the Oberlaender Trust of Philadelphia, which is financing the trip, Dr. H. E. Kleinschmidt sailed on the S.S. New York, March 28 to study exhibit building in Germany, the Netherlands, and Austria. He will also visit Czechoslovakia, Switzerland, France, and England before returning about the end of May.

Hygeia, April, 1935—"Health Pursuits in Pictures," one or more pages in the monthly issues of *Hygeia*, offer possibilities of use in state and local health material. And those in *Hygeia*

may suggest other usable pictures. Any health worker will receive a free copy by writing to *Hygeia*, 535 N. Dearborn St., Chicago, Ill.

Plans for economic security. Guaranteed—but how (cure frauds)? The more common skin infections. Heart diseases of middle life. The childhood type of tuberculosis. Antony Van Leeuwenhoek: first of the microbe hunters (1162-1723). Harvest-mites and ticks (11th parasite). Tooth decay. Shadows (a play). Reëducation of the blind. William Henry Welch. Medicine in ancient America. Eye diseases in adults. Facts and fallacies about milk. The housewife looks at coffee and cerebral beverages. New books on health. Healthgrams. Questions and answers.

"School and Health" this month includes:

The schoolhouse and grounds suggest health teaching. Health teaching in April. Solving health educational problems. How I use *Hygeia* in my health teachings. Adventures in charm: a health program for adolescent girls. A health peep-show. New books for teachers and pupils.

What Is Needed—"What this country needs" more than a good 5-cent cigar, is more talking back by those doing health education.

This department of the *Journal* would mean vastly more to public health education if readers would say more—for or against something or other.

Why don't we hear from those who have held offices in the Section? Those who have been on Section programs? And those who are doing the job but who seldom or never get to the annual meetings?

Speak up, ladies and gentlemen!

As Done by Others—The first value in learning about what others have done is the spur to our own thinking. What some one else has done may do more than to shake one loose from a method or an idea—a no mean help to the health educator. Here is an assortment of what they have done.

"Dialogue-of-the-Day," a series in *Public Health Nursing*, a form of presentation usable in several ways. In the March, 1935, issue "Trichinosis" and "Public Health Nurse" conduct the dialogue. Both characters have one or two needlessly long parts. Broken up more fully by questions and answers the dialogue would gain liveliness. Address 50 West 50th St., New York, N. Y. 35 cents.

"Have You Read?" is a mimeographed page-a-week of reading references issued by Public Health Division of Municipal Reference Library, 139 Centre St., New York, N. Y.

"Health in a Milk Bottle" by Mamie E. Rice of Prince Edward Co. Health Dept., Farmville, Va., describes a county fair exhibit, and illustrates a use of the widely available emergency labor. Illustrated. *Public Health Nursing*, 50 West 50th St., New York, N. Y. Jan., 1935. 35 cents.

The whole exhibit included a fly trap; a manure bin with a fly trap window; a miniature bath room equipped with porcelain built-in tub, stool, and basin all connected up with a septic tank and drainage field; a mosquito exhibit; dental posters and the equipment for a dental clinic in school. In preparing the exhibit of the work of the Nursing Service, I called the VERA to my rescue and was offered the service of an expert workman to build the milk bottle that had been planned, and a local manufacturing company offered the use of their equipment in building the bottle—8 feet tall and 3 feet in diameter. The workman was allowed 3 days in which to do the job. He became so interested that time meant nothing to him and when the bottle was completed it not only was a work of art, but it was generally known that the Health Department was going to have an exhibit at the Fair and Mr. Haga was building a milk bottle at Taylor's to be used in the health exhibit!

With the assistance of the VERA workers, we finally developed what many said was the "most attractive exhibit at the Fair." Food for the family was emphasized. The bottle was divided into four sections—daily food supply for the infant, for the preschool and school child and the family of 5. Dolls were dressed to represent each age group and the

foods suitable and necessary for each group placed on a tray in each section—milk and green vegetables always in evidence. . . .

Posters on a black wall and the white milk bottle towering 8 feet high were in striking contrast to the rest of the colored booths and formed, therefore, an outstanding exhibit.

"A Health Week in Far-off Bengal," by Sister M. Frances. *Public Health Nursing*, 50 West 50th St., New York, N. Y. Dec., 1934. Health local color.

In "I'm Safe from Smallpox: Are You?" Marguerite Breen makes good use of vaccination of Shirley Temple. *Everybody's Health*, 11 W. Summit Ave., St. Paul, Minn. March, 1935. 10 cents.

"Sanatorium Patients Write Newspaper Letters on Tuberculosis" is a page of reproductions of newspaper titles, clippings received in the 1934 newspaper sanatorium letter contest conducted by the Minnesota Public Health Assn. Many patients wrote letters to their home town papers which gave them prominent positions. *Everybody's Health*, 11 W. Summit Ave., St. Paul, Minn. March, 1935. 10 cents.

"The Seven Wonders of the World," health wonders, of course, have been listed in the weekly bulletin of Santa Barbara Co. Health Dept., Santa Barbara, Calif. Dec. 24, 1934. Here is an idea to play with for emphasizing achievements and resources. Health Officer Main credits the idea to a forgotten periodical not devoted to health.

Seven editions of *Health News* are issued, one for each of 7 health districts in New York City. Edited by Savel Zimand (formerly with Bellevue-Yorkville Demonstration), Dept. of Health, 139 Centre St. Mimeographed; 8 pages; one page, outline map of the city; 3 pages of local items; 4 pages common to the whole group.

All ye who edit the table of contents of a popular or professional journal on health are hereby requested to note the new arrangement of the table of con-

tents in *Hygeia*. Each article gets more space in the contents. And with the article title is given bits of information about the author or about the article itself, without digging through an additional page for such supplementary information.

Non-Technic Reading for Technicians—What are the books that will stimulate and enrich our thinking, our writing or speaking, or our planning?

Recently readers of *Printers Ink* voted on a two-foot shelf, not about advertising, which all advertising men should read. Would this list of 16 titles help our readers?

The Bible . . . Middletown, by Lynd
 . . . Shakespeare's Works . . . The Golden
 Bough, by Frazer . . . American Com-
 monwealth, by Bryce . . . The Art of
 Writing, by Quiller-Couch . . . Emerson's
 Essays . . . Fifty Great Selections by
 Ingersoll . . . Our Times, by Sullivan
 . . . Outline of History, by Wells . . .
 Microbe Hunters, by de Kruif . . . Ring
 Lardner's Works . . . Huckleberry Finn,
 by Mark Twain . . . O. Henry's Works
 . . . Jurgen, by Cabell . . . Anthony
 Adverse by Allen.

Contest Craze—A flood of contests via newspapers and radio is discussed in *Business Week*, 330 W. 42d St., New York, N. Y., March 9, 1935. 20 cents.

There isn't any rational explanation for the present rush of contests which got well under way last summer and which has been mounting in intensity all fall and winter. Advertising men, who act first and analyze afterward, point to the rising interest in foreign lotteries as a symptom of the public's craving for contests. Maybe it's all part of the post-depression psychology; maybe the new leisure has something to do with it. Analyses aren't important. To advertisers all that matters is that the public is contest-conscious. Which means that a contest has more than a fair chance of clicking, and when a contest clicks it is one of the best and cheapest forms of advertising.

Public health could not possibly compete with business and industry in

offering prizes. But, as *Business Week* suggests, interest in contests may not be based wholly on prizes. An abiding interest in crossword puzzles with no prizes for their solutions is evidenced by newspaper space given to them.

Many an advertiser still clings to the belief that a successful competition has to have elements of a game in it. Hence the continued popularity of such old favorites as the figure-path, crossword, and identification puzzles, limericks, photograph, word-building, and "what's wrong with this picture?" competitions.

Is not the puzzle idea worth consideration by clever health workers? The "true and false" test, and other newer knowledge test forms seem to offer possibilities, as well as some forms used by advertisers. Is it not possible that some newspapers and a goodly proportion of their readers would welcome non-commercial material?

Please send the editor samples of any contest or puzzle material you have used in times past.

FOR EDUCATION AND REFERENCE

"Comparability of Maternal Mortality Rates in the United States and Certain Foreign Countries," by E. C. Tandy. Children's Bureau. Supt. of Documents, Washington, D. C. 5 cents. Technical, but "Summary and Conclusions" make clear that

This official figure of the United States, which in the last few years has exceeded that of every country except Scotland, remains high no matter what method of assignment is used.

"Dietary Cults, Past and Present," Harriet Morgan. *Trained Nurse*, 468 4th Ave., New York, N. Y. Feb., 1935. 20 cents.

"Food as a Far-Reaching Factor in Health," by H. C. Sherman. *Child Health Bulletin*, American Child Health Assn., 50 West 50th St., New York, N. Y. Jan., 1935. Reprint, 3 cents.

A series of quotations and evidence to

the value and need of public health nursing service. For local publicity. *Free* of National Organization for Public Health Nursing, 50 West 50th St., New York, N. Y.

"Volunteers—An Asset or a Liability." Reprint from *Public Health Nursing*, 50 West 50th St., New York, N. Y. 10 cents.

"Experimentation and Medicine," by A. J. Carlson. *Hygeia* reprint. Am. Medical Assn., 535 N. Dearborn St., Chicago, Ill. 5 cents. Copy free to health worker writing on organization letterhead. If you send copies to your "chief editorial writers" we suggest that you mark the reference to the hunter, fisherman and trapper.

"Obesity" is made up of 4 articles from *Hygeia*. Covers diet, "cures," "treatments," etc. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. 15 cents.

"What You Have Helped Us Do This Year" occupies the inside title page of the miniature annual report of Illinois Society for Prevention of Blindness, 203 N. Wabash Ave., Chicago, Ill. Two pages each of narrative reporting appear under "What you have helped us do on trachoma" and "What you have helped us do for babies."

NEW

Clearance, a tabloid "news digest of western public health and social welfare." "The news of 11 western states—national and foreign news." \$1.00 a year. Preliminary issues underwritten by California Tuberculosis Assn., 582 Market St., San Francisco.

Health succeeds *Michigan Out-Of-Doors*, Michigan Tuberculosis Assn., Lansing. In size 6¾ by 9¾; light weight, dull finished paper keeps down cost but makes possible the good use of half-tones. The cover, on heavier stock, illustrates a new use of photographs—from top to bottom: a ½ inch tint band across the page; a 2 inch

band of white for the title, volume and number; 6½ deep photograph bleeding at both sides; 1¼ inch band of white on which appears the date and "In This Issue" references; with another ½ inch tint block across the bottom.

Health Digest, American Health Publishers, 139 E. 36th St., New York, N. Y. 25 cents an issue. Similar to other "digest" periodicals. Material largely from known acceptable sources.

Although it has started its second volume it is new to us—*Health Progress*, New Jersey Health and Sanitary Assn., Freehold, N. J. Edited by John Hall who cannot avoid an editing job.

News Letter, California Tuberculosis Assn., 45 2d St., San Francisco. Mimeographed cover sheet of colored paper, with printed stock heading, balance of sheet mimeographed.

IN BULLETINS AND JOURNALS

"Ancient and Honorable Hospitals" is a group of old and new pictures—the oldest and some nearly as old. *Bulletin*, American Hospital Assn., 18 E. Division St., Chicago, Ill. April, 1935.

Another example of conversation to present a situation is on the public health nurse page of *New Mexico Health Officer*, Santa Fe. March, 1935.

"The Burden of Mental Disease" is treated in Feb., 1935, issue of *Statistical Bulletin*, Metropolitan Life Insurance Co., New York, N. Y. *Free*.

"Cancer" is the subject of the Nov.-Dec., 1934, issue of *Commonwealth*, Massachusetts Dept. of Public Health, Boston. "Prepared for physicians in the state to enable them to find easily accessible material on cancer, both for use in their general practice and for the preparation of short talks to the public"; 98 pages; also *table of contents*, plus 4-page *index* to the four issues of 1934.

"Insects in Relation to Human

Health" is the theme for the Jan.-March, 1935, issue of *Iowa Public Health Bulletin*, Des Moines, Iowa.

A group of newspaper headlines is reproduced to emphasize an article on heart disease in *The Crusader*, Wis. Anti-Tuberculosis Assn., 1018 N. Jefferson St., Milwaukee, Wis. Feb., 1935. "Wisconsin Becomes Wise about Tuberculosis," in the same issue, is an encouraging report on follow-up visits to 37 back-country people who had been to a chest clinic. There are 4 oblong silhouettes, a brief history of the development of medicine, prepared for Milwaukee Country Day School. Others may wish to use them—various possible uses.

"Learning about Tubercle Bacilli" reproduces compositions from grade school pupils in 1910 after they had heard a lecture by Dr. E. R. Baldwin. *Journal of the Outdoor Life*, 50 W. 50th St., New York, N. Y. April, 1935. 15 cents. Evaluation of such material needs to reckon with the nature of the presentation by the speaker.

"Pioneering in Health Education," by Elizabeth Ulmer. *Public Health Nursing*, 50 W. 50th St., New York, N. Y. April, 1935. 35 cents. A nurse in a state teachers college where students come from a section in which many of the people have never seen a train or read a newspaper."

"A Project in Rural School Health Education," by R. E. Grout. Reprint from Milbank Memorial Fund (40 Wall St., New York, N. Y.) *Quarterly*. Jan., 1935. Free.

"Public Enemy No. 1—The Rat," in *Everybody's Health*, 11 S. Summit Ave., St. Paul, Minn. April, 1935. 10 cents.

"School Health" is one of a "Modern Elsie Series" in which the school nurse does just the right thing, or discovers her errors and promptly rights them. In *Public Health Nursing*, 50 W. 50th St., New York, N. Y. Con-

versation in print is one of the hopeful teaching devices.

REPORTING

Colorado Springs, Colo., in the report of Dept. of Public Health and Sanitation has avoided that typical official printer atmosphere on the cover page, also by the use of dull finished paper for the text. We find no mention of public health education.

"Children's Dentistry in Honolulu" is a report of Palama Settlement Dental Clinic, *Honolulu*, Hawaii, and includes a report of the Division of Dental Hygiene, Dept. of Public Instruction. Effective is this line on the envelope: "How 8 Dentists Cared for 8,445 Children."

The mimeographed report of the *Lake County Health Commissioner* is as simple and inexpensive as possible. It is addressed to the Lake County Board of Commissioners, Crown Point, Ind. A page of narrative is followed by a page with 53 numbered items covering services and other activities, and a page on the work of the sanitary inspector. One improvement at slight additional expense would be to use 4 letter size sheets rather than the 3 legal size sheets.

A biennial report of *Iowa State Dept. of Health*, Des Moines, includes a condensed *table of contents*, a 6 page *index*, and a 25 page section on child health and health education.

Maplewood, N. J., Board of Health, used the mimeograph to advantage in producing its annual report. Printed cover on stiff paper; 5½ by 8½ in size; mimeographed on right pages only; a heading at top of each page.

The report of *New Brunswick Dept. of Health*, Fredericton, carries a "contents" somewhat more detailed than is sometimes the case. There is no direct mention of health education, but a paragraph tells of a dental health campaign conducted in coöperation with

other agencies. Adults as well as school children and teachers were reached.

"*Pasadena Health Activities—1934*" is a 115 page mimeographed report; letter size pages; effective printed stiff cover; *with a 4 page index*; several references to health education, most significant of which is the following:

Members in every division of the Health Department should be capable of giving interesting as well as instructive health lectures and to this end special training is being carried on.

"Days and Deeds of Christmas Seal Dollars," annual report of *Philadelphia* Health Council and Tuberculosis Committee, 311 S. Juniper St. 12 pages; 6 by 9; rough finished paper; type and paragraphing give freedom from sense of crowding; one line heads across the two columns on a page; narrative report with one bar diagram. One page, "Three Factors in the Tuberculosis Movement," concisely describes the parts of official agencies, the medical profession, and the voluntary agencies. The financial report includes a description of every item of expenditure such as:

Health Education Service—Lectures, motion pictures, radio talks, window displays, exhibits, pamphlets, publications, newspaper and periodical publicity (\$14,693.33). Special

campaigns of information on early diagnosis and community tuberculosis problems, conferences, etc. (\$8,398.84). Christmas Seal educational work included in preceding items. Information and advisory service to aid the sick in securing examinations, treatment and care (\$797.52) . . . \$23,889.69.

The Biennial report of *Tennessee* Dept. of Public Health, Nashville, includes a *table of contents* and several groups of photographs illustrating conditions and projects.

The People Want to Know—At least in North Carolina they ask questions, according to *Health Bulletin*, State Board of Health, Raleigh, which says:

In this state, of more than three million people, it is natural to suppose that a large and increasing number of people will be constantly writing to the State Board of Health for definite information on a variety of subjects affecting the health of the people. An inconceivable number of questions on every known subject in the field of medicine and public health are received during the course of every year. Naturally a large proportion of these questions cannot be answered, but many of them can be answered with benefit to the inquirer. The keynote to this service in the replies sent out is information on how to protect the individual families from the ravages of preventable diseases. A large amount of personal advice is offered in such matters as nutrition and immunization against communicable diseases.

BOOKS AND REPORTS

Memoirs of a Small-Town Surgeon
—By *John Brooks Wheeler, M.D.*
New York: Stokes, 1935. 336 pp.
Price, \$3.00.

These memoirs, as they are called, really constitute an autobiography. Conscientious and properly written autobiographies are always interesting as well as valuable. Dr. Wheeler graduated from Harvard Medical School and began his internship in the Massachusetts General Hospital in August, 1878, just when Lister's teachings on surgery were beginning to attract notice in this country. He had the great advantage of not only knowing but serving under many of that wonderful group of men who were teaching at Harvard, and in charge of the Boston hospitals, at that time. There is no question that he made good use of his opportunities and his story brings us, as it were, into intimate personal touch with them in a delightful way.

In 1879 he went to Europe and again had the good fortune of coming into contact with many of the great men of Germany, who had gone further than American physicians in the adoption and practice of antiseptic surgery. He gives interesting sketches not only of those engaged in surgery, which was his chief interest, but also the professors of medicine, obstetrics, anatomy and pathology. He finally settled in Burlington, Vt., where he eventually became Professor of Surgery in the Medical School of the State University.

Approximately one-half of the book is devoted to this period of the author's life, and will have for the average reader the greatest interest. The rest of the book is made up of personal

reminiscences, descriptions of interesting operations, and the hardships of a small town doctor, such as driving 25 miles with the thermometer 20 or more degrees below zero in a sleet storm, and doing operations in kitchens, on kitchen tables and with other make-shift paraphernalia.

The book is pleasingly written and shows a keen sense of humor. It is well printed and has only 4 illustrations, one giving a portrait of the author, and the other 3 giving scenes of operations in 1874, 1893, and in 1934, the first being before antiseptic surgery was practised and the last showing a completely modern operation.

MAZÛCK P. RAVENEL

Rats, Lice and History—By *Hans Zinsser. Boston: Little, Brown. For the Atlantic Monthly Press, 1935. 301 pp. Price, \$2.75.*

Dr. Zinsser has written a very entertaining and instructive book. The major theme has to do with epidemics—typhus in particular—and the influence of these epidemics upon the fate of nations and civilization in general.

Disease is often able to accomplish what generals fail to do, and, in an even more relentless fashion than modern warfare. Any story of typhus must be largely one of animal reservoirs of infection and insect vectors—hence the rats and lice!

The first few chapters give Dr. Zinsser a chance to "explain" and defend his enjoyment from writing of medical drama, and to discourse on a wide range of subjects—"popular science"—the neurosis-conscious biographers, Gertrude Stein. One feels sure that he

had a very good time writing these early chapters!

The discussion of parasitism in general—ushered in by philosophical musings on the origin of life and man's attempt to solve the mystery—gives the fascinating story of parasitic adaptation of infectious microorganisms, the hosts' acquired tolerance, and the resultant shift of the disease in epidemiological importance. Syphilis is an admirable example. The change in habits of the animal host (domestication of the rat) may account for the vanishing of plague from Western Europe.

Although early medical records are often obscure it seems fairly certain that most of our present-day diseases are "old" diseases and that epidemics have played their dramatic rôles in history from the beginning. Plague drove the Spartans out of Greece in the time of Pericles; diseases contributed largely to the fall of Rome; typhus probably led to the defeat of the army of Francis I of France in 1528; plague played a most important part in the outcome of the Thirty Years War; Napoleon was helpless against his opponents, typhus and dysentery.

The genealogy of the louse proves an interesting story, as well as the conquest of the world by the brown rat, who shares many of our human characteristics, according to Zinsser.

After eleven preliminary chapters the subject of typhus proceeds in uninterrupted fashion. The symptoms of typhus, the clinical types, and the transmission of *Rickettsia* bodies to man by the variety of complex parasitic cycles are described. The first undoubted description of typhus dates from 1489 and 1490 during the Civil War in Granada, when 3,000 men were killed by the Moors, 17,000 by disease.

On through the years, and in all parts of the world typhus repeated its grim story. During no war were men free of lice—lice usually meant typhus. In the

World War, typhus broke out in the Serbian army, spread along the entire eastern front, and, from 1917 to 1923, caused more than 25,000,000 cases in the territories controlled by the Soviet Republic and over 2,000,000 deaths. Typhus, though restricted, is not dead.

Dr. Zinsser gives due credit to medical historians and is modest about his own part in the study of typhus.

Some readers may regard parts of the book as a trifle facetious, but again these very parts may give the book a piquancy to other readers. Anyway, it is delightful as well as most informative reading. ANNA DEAN DELANEY

Tuberculosis—By *Fred G. Holmes, M.D.* New York: *Appleton-Century*, 1935. 312 pp. Price, \$2.00.

The tuberculous patient who reads this book will acquire a personal friend as well as wise counsel. He will turn to this friend time and again as he needs information and fresh courage. The present reviewer, approaching his task in a critical mood, found a few errors of fact and of concept, literary laxities and typographical slips, but in the end pushed them all aside as of small consequence as compared with the general effect of the whole. It is the spirit that counts in a book like this. In the process of explaining how tuberculosis acts and what to do about it the author has a way also of reassuring his reader and of inspiring him with confidence. This knack springs out of his own experience with the disease.

Chapter XIII is a good sample. It describes the pathology of tuberculosis but not in the usual medical language, which to a non-medical reader would be dull and incomprehensible. Instead we are invited to witness a thrilling contest involving the invasion of the tubercle bacillus and the stout resistance of the bodily forces. The battle ebbs and flows. There is suspense, despair, hope. Unforeseen circumstances that might

decide the issue are suggested. And throughout the fight, the reader beholds how he himself may give aid to his fighting forces, or, through carelessness or lack of fortitude, connive with the enemy.

Part I of the book is complete in itself for the patient who is treated in the usual manner. Part II deals entirely with surgical methods of collapsing the lung and is for those patients who are receiving collapse therapy or who have it under consideration. The difficult subject of the mechanics of respiration and the principles of pulmonary collapse are simplified. The last, perhaps one of the most valuable chapters, is an informal talk between a physician and his patient dealing with the numerous little problems that confront the patient in his relationships with his medical adviser, his finances, and medical ethics.

In no other disease is the coöperation of the patient more imperative than in tuberculosis. Moreover tuberculosis is a long drawn out struggle giving the patient plenty of time to study the subject. That may account for the many books for the tuberculous patient. But there is still room for this one.

H. E. KLEINSCHMIDT

Standard Classified Nomenclature of Disease—Compiled by National Conference of Nomenclature of Disease. Edited by H. B. Logie, M.D. (2d ed.). New York: Commonwealth Fund, 1935, 869 pp. Price, \$3.50.

This is the second edition of this useful publication, the first official edition having been published in January, 1933. In the meantime, the *Nomenclature* has been installed in the record rooms of 120 or more hospitals, and 27 national organizations have officially approved the list. A number of important hospitals, which were among the pioneers in the classification

and use of hospital statistics, were apparently represented on the Conference Committee only indirectly, and are not as yet listed as users of the *Nomenclature*, possibly preferring to use systems already installed.

As a result of the suggestions from users during the past 2 years, some sections of the *Nomenclature* have been revised or rewritten by the committee in charge, the more important changes occurring in the sections on endocrinology, neurology, and diseases of the cardiovascular and musculo-skeletal systems. The index has been enlarged by about 2,000 items; it now contains nearly 15,000. Code numbers have been simplified somewhat for the benefit of punch-card procedure.

The general plan of classification remains the same as before, each title being classed according to anatomical site and etiology. The code numbers reflect in logical and simple fashion the place of any title under these two criteria. Moreover, they allow for future growth without upsetting the existing system. The *Nomenclature* can truly be said to represent an achievement in scientific classification.

The typography is excellent, except that the highly important introduction is printed in a rather small font. The paper of the pocket edition reviewed may be found to lack the toughness desirable in a book of reference; possibly a more substantial paper back may be available in a desk edition. Otherwise, the physical characteristics of the book are on a par with its well organized content.

A. W. HEDRICH

Community Hygiene — By Dean Franklin Smiley, A.B., M.D., and Adrian Gordon Gould, Ph.B., M.D. (rev. ed.). New York: Macmillan, 1935. 369 pp. Price, \$2.00.

The second edition of this college textbook on public health follows the scheme of the earlier edition, issued in

1929, with the addition of various new facts and a chapter on the cost of medical care. As was stated in the review of the first edition, this material, covering the whole field of community health and sanitation, is sound, well stated, and sufficiently inclusive. There are numerous illustrations, some good, many poor, and some rather antique. The references appended to each chapter are, on the whole, rather elderly and far from adequate. The book has a fairly good index, and its make-up and printing are good. JAMES A. TOBEY

Nutrition and Physical Fitness—By *L. Jean Bogert, Ph.D. (2nd ed.)*. Philadelphia: Saunders, 1935. 566 pp., 65 ill. Price, \$3.00.

Another edition of Dr. Bogert's book a few years after the first publication, attests to its popularity. In its revision, the chapter on the vitamins is expanded and corrected in accordance with recently established facts; the part on atonic and spastic constipation is more fully discussed and special diets recommended; and in accordance with the times, the section on food consumption and costs is explicitly expressed. In its substance, Foods, Body Requirements, Body Processes, Meal Planning, and Diets for Special Conditions, are some of the titles used to describe the parts of the book. And Protein Rich Foods, Fruits and Vegetables, Conditions Which Determine the Energy Requirements, Vitamins—and Where They Are Found, Digestion, Excretion and Factors Affecting It, How to Build Menus, Food Fads and Fancies, Diet after Forty, Malnutrition—How to Detect and Overcome It, and Diseases in Which Diet Is of Major Importance, are the sub-titles used to describe some of the chapters. In general, the book contains a great deal of useful and reliable information on nutrition; but little is written about physical fitness. It is written in an easy style

using simple terms; and thus is a book that should be found very useful to the laity, nurses, and student dietitians.

FRANCIS L. BURNETT

Personal Hygiene Applied—By *Jesse Feiring Williams, M.D. (5th ed.)*. Philadelphia: Saunders, 1934. 529 pp. Price, \$2.25.

A book which has been before the public since 1922, and has run the gauntlet of criticism from which it has come out unscathed so that it has reached its fifth edition, needs little comment. It has proved that it has won a place in public esteem. The present edition has been brought up to date and deserves the commendation which has been given to those which preceded it. MAZÏCK P. RAVENEL

Occupation and Health—*An Encyclopaedia of Hygiene, Pathology, and Social Welfare. Published by the International Labour Office, Geneva, 1934. Distributed in the United States by the World Peace Foundation, 40 Mt. Vernon St., Boston, 1935. (2 vols.) Vol. II, 1294 pp., 207 ill. I-Z. Price (paper), \$11 per vol.; (cloth) \$12 per vol.*

The long awaited second volume of this important work has now appeared. Volume I was reviewed in this *Journal* (Vol. XXI, p. 1288) in November, 1931. As was the case in the first volume, nearly one hundred experts in the field of industrial health have contributed to this work. It is concise and expressed in as simple a form as is consistent with scientific accuracy. It deals with 5 general types of subject matter: industries, harmful substances, diseases, the workers themselves, and specific problems of industrial health.

Each cause of disease is discussed according to a uniform plan under the following headings: Chemistry or Biology, Sources of Intoxication, Toxicity,

Statistics, Pathology, Demonstration in the Environment, Hygiene, Legislation, and Bibliography. The occupational hazards and the various environmental conditions of workers are treated in a similar logical manner.

This volume contains a general discussion of 140 pages entitled *Occupational Diseases*, which includes sections on: Historical Review, Definition and Compensation, Statistics, Clinical Examination, and a discussion of specific diseases classified according to the location of the lesions in the body. This division of the book also contains a résumé of the most important facts about the industrial diseases, arranged in convenient tabular form.

These two volumes form a complete, reliable, and very usable reference work in the field of occupational hygiene. The libraries of universities and health departments in industry will find it invaluable.

C. E. TURNER

Health Stories—Book Two—Curriculum Foundation Series—By Anna B. Towse, Florence E. Matthews, and William S. Gray. Chicago: Scott, Foresman & Co., 1934. 176 pp. Price, \$.68.

A most interesting and useful little book, the average grown-up would call this. It would have to be a disagreeably sophisticated second grade pupil who could not enjoyably imbibe the practice of health habits from this beautifully printed and illustrated series of health stories. And there are notes for the teacher, too, at the end of the book and a vocabulary. Keeping clean and neat; taking care of the body; eating the right foods; keeping well; safety; and keeping happy are the headings of the 6 parts into which the book is divided.

Public health workers with 7 year olds could with profit try out these stories at home.

MERRILL E. CHAMPION

Hygiene and Sanitation—By Jesse Feiring Williams, M.D. (3d ed.) Philadelphia: Saunders, 1935. 372 pp. Price, \$2.00.

This book is well known and needs no criticism. This edition has been revised and brought up to date, giving the latest statistics on mortality and morbidity and much new material on the vitamins. A new section on social hygiene has been introduced. Dr. Williams's books are well known and always worth study. They are a valuable addition to any library. The printing and binding are excellent.

MAZÛCK P. RAVENEL

The Spastic Child—By Marguerite K. Fischel. St. Louis: Mosby, 1934. 97 pp. Price, \$1.50.

The Spastic Child is a story written by a mother telling of the rehabilitation of her son physically, mentally, and socially.

It is interesting reading and should be helpful in bringing a ray of hope to other parents or persons caring for children suffering from Little's disease.

Two points are strongly emphasized throughout the book: first that the care of the spastic child is the parents' responsibility, and second that regular treatment is essential to improvement.

The most valuable suggestion given is that one must teach the child normal habits of motor control before irregular ones are formed.

Self-discipline, the author states, is as necessary for parents of the afflicted child as for the child himself.

This mother makes you feel that to help a spastic child to enjoy as nearly a normal life as possible is a privilege rather than a hardship.

ALLENE SHERRILL

Food Products—By Henry C. Sherman. New York: Macmillan, 1933. Price, \$3.00.

This well known book which has been

standard since 1914, when the first edition was issued, has been completely rewritten. The name of the writer guarantees the authenticity of the material. There are four appendices:

A. The Food and Drugs Act ("Pure Food Law") and Related Regulations and Decisions

B. The Meat Inspection Law and Regulations

C. Calcium, Phosphorus, Iron, Copper, and Manganese Contents of Foods

D. Food Products as Sources of Vitamins

These add greatly to the working value of the book. The printing and binding are excellent.

MAZÏCK P. RAVENEL

Medical Tactics—By Colonels Gustavos M. Blech and Charles Lynch. Baltimore: Thomas, 1934. 205 pp. Price, \$4.00.

The people of this nation are, on the whole, peaceful, but not pacifistic. Every rational citizen has the commendable desire to keep out of another war, but all sensible persons also realize that one of the best guarantees of peace is a reasonable state of preparedness.

Reserve officers of the Medical Department of the United States Army will find this text, written by one of their own colleagues in collaboration with a retired officer of the Medical Corps, a most valuable training manual. Unlike many books on such abstruse subjects as tactics and logistics, it is as interesting as it is instructive, for it is presented in a narrative style, more like a series of stories than a mere pedagogical outline of dull facts.

Since medical officers need more than professional skill in order to achieve military success, they can derive from this book much worthwhile information on the principles of war, the functions of the medical service at the front, and the technic used by this important branch of the army during all types of

armed conflict. Unfortunately, not much attention is given to the Sanitary Corps.

The book is well printed, has a good index, a glossary, a bibliography, and is supplied with several supplementary maps for the working of tactical problems. It is highly commended for its purpose.

JAMES A. TOBEY

Big Problems on Little Shoulders—By Carl Renz, M.D., and Mildred Paul Renz. New York: Macmillan, 1934. 129 pp. Price, \$1.50.

"A grown-up's guide to a child's mind" is the way this book's jacket characterizes the contents and the description is a reasonably apt one. In twelve chapters, various factors which may affect the child's attitude toward life are discussed in simple language. Stress is placed largely on aspects of the feeling of inferiority and on problems of sex. Some of the things that are usually touched on in a manual of this sort are omitted. On the other hand the style is unhackneyed and very readable; the attitude, most sympathetic. Parents will read this book and get a good deal out of it and may be led thereby to go more deeply into the subject of child training.

MERRILL E. CHAMPION

Fundamentals of Dairy Science—By Associates of Lore A. Rogers. New York: Reinhold Publishing Corporation, 1935. 602 pp. Price, \$6.00.

The first edition of this book was greeted with acclaim. It has served a useful purpose and has been widely quoted. It consequently needs no introduction. For this edition the contributions have been revised and brought up to date as far as possible by the original authors, and where this could not be done, by competent men whose names are given under such articles. As

stated in the preface, "This book has been written to fill a need experienced by advanced students and research workers in the field of dairy science." There can be no question that the second edition will receive a welcome equal to that of the first.

The book is well printed and bound, and each chapter has a well selected and extensive bibliography attached. The volume is an American Chemical Society Monograph.

MAZŮCK P. RAVENEL

Practical Everyday Chemistry—By H. Bennett. New York: Chemical Publishing Co., 1934. 305 pp. Price, \$2.00.

This book should prove to be a valuable manual in many laboratories as it gives directions for preparing a variety

of products as well as the composition of many common products. Various chapters give working formulae for adhesives, agricultural products, paints and related products, cosmetics and drugs, food products, beverages, inks and carbon paper, leathers, oils, constructing materials, paper, photography, plating, polishes, rubber and plastics, soaps and cleaners, textiles and many other products in use in daily life. One chapter includes tables, and other useful information regarding sources of information and materials.

Brief introductory paragraphs at the beginning of each chapter are informative. In some cases, these could have been enlarged to advantage. The author has had previous experience as the Editor of the *Chemical Formulary*.

C. S. PEDERSON

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Provincial Health Administration—This history of the Ontario public health administrative development serves as an interesting companion piece to the picture presented in a few of the progressive states south of the border.

ANON. The Development of Public Health In Ontario. *Canad. Pub. Health J.* 26, 3:110 (Mar.), 1935.

School Sanitary Score Card for Nurses—Record form devised by a school superintendent to enable the school nurses to give a more complete picture of the sanitary aspects of the school in their monthly reports.

ANON. The American School Board Journal, 90, 2:30 (Feb.), 1935.

Decline in Births Halted?—In New York City the last 4 months of 1934 showed an increase in births over the corresponding period of the pre-

vious year for the first time in years. The increase was 1,265 births, compared with declines averaging over 2,000 for the period since 1930. The same publication reprints a review of the 1934 mortality by cause, which had been released to the press as of January 1. Quite a performance!

ANON. *Quart. Bull., Department of Health, New York City.* III, 1:5-18, 1935.

Pellagra Declines—The death rate in 12 states has dropped more than half since 1929. This Bulletin also contains a review of 1934 industrial mortality from various causes.

ANON. Pellagra Deathrate Continues to Decline. *Stat. Bull., Met. Life Ins. Co.* 16, 1:5 (Jan.), 1935.

Longevity Increases—The expectation of life at birth among Metropolitan policy holders was 59.1 years in 1933, an increase of 1.8 years since 1930, this

in spite of the depression. The reasons are still cause for speculation. Each age, color, and sex benefitted from the mortality decline.

ANON. Longevity of Industrial Policyholders During the Depression. *Stat. Bull., Met. Life Ins. Co.* 16, 2:1 (Feb.), 1935.

Statistics of Murder—Negroes, foreign born (especially Italians), single males, and married females loom up among the victims of homicide. The conviction rate for murder is highest for Italians; but juries discriminate notoriously against the foreign born.

DEPORTE, J. V., and PARKHURST, E. Homicide in New York State. *Human Biology*, 7, 1:47-73 (Feb.), 1935.

Pro BCG—In the research reported, BCG cultures did not acquire virulence on liquid media containing serum or in depths of nutrient broth or by successive selection of smooth-appearing colonies or by repeated animal passage. This is offered as counter evidence to the claims that BCG may develop virulent variants.

BEHNER, D. M. The Stability of the Colony Morphology and Pathogenicity of BCG. *Am. Rev. Tuberc.* 31, 2:174 (Feb.), 1935.

Infectious Periods of Venereal Disease—Syphilis should be considered infectious until after 6 months of intensive treatment; gonorrhea in men until 6 months after all evidence of the disease, women until after 3 months, and children 1 month.

CASSELMAN, A. J. When Is a Person with a Venereal Disease Dangerous? *Pub. Health Nurs.* 27, 4:186 (Apr.), 1935.

Debunking Vitamin A vs. Resistance to Disease—Though a loss of resistance to infection does occur in adults with outspoken deficiencies of vitamin A and probably vitamin C, the addition of these vitamins to an already normal diet will not increase immunity to infection. However, in infancy a

state of susceptibility does occur, which persists and is preventable by an adequate diet especially rich in vitamin A.

CLAUSEN, S. W. Nutrition and Infection. *J.A.M.A.* 104, 10:793 (Mar. 9), 1935.

The Sick and the Dead—Major causes of death are not the most frequent causes of sickness; the degenerative diseases lead the death causes, whereas the respiratory diseases lead the latter (whether disabling or non-disabling). Illness is most frequent under 5 and least frequent at 15-19. These are but two of many useful findings resulting from an extensive family illness survey.

COLLINS, S. D. A General View of the Causes of Illness and Death at Specific Ages. *Pub. Health Rep.* 50, 8:237 (Feb. 22), 1935.

Pardonable Choler—Medical broadcasts considered alone are good publicity. But they cannot be considered alone. If the problem of rickets prevention is presented, every food in the market appears as its vehicle. When it is suggested that people should avoid colds, we find them gargling a half dozen flavored solutions because they are told through the same publicity media that this is the way to avoid colds. Perhaps the worst hallucination the medical profession ever sanctioned was the idea that bowels should move every day. If the broadcaster cannot be specific, somebody else can, so we bait the hooks and they catch the fish.

COMMITTEE ON PUBLIC HEALTH. The Hazards of Publicity. *New Eng. J. Med.* 212, 12:525 (Mar. 21), 1935.

Irradiated vs. Yeast Milk—Of the milks used in this comparative study, irradiated milk contained per unit of measure more vitamin D than did the yeast milk.

GERSTENBERGER, H. J., *et al.* Antirachitic Cow's Milk. *J.A.M.A.* 104, 10:816 (Mar. 9), 1935.

More Amebic Dysentery—During the Chicago stockyards fire, heavily polluted water was drunk by firemen and spectators. A high percentage of the exposed became infected with *E. histolytica* and some with typhoid bacilli, causing acute diarrhea. The evidence is unmistakable that amebic dysentery is a water-borne disease.

HARDY, A. V., and SPECTOR, B. K. The Occurrence of Infestation with *E. Histolytica* Associated with Water-Borne Epidemic Diseases. Pub. Health Rep. 50, 10:323 (Mar. 8), 1935.

Stream Pollution and Purification—The rate of stream purification depends upon the relation of wetted surface. It is slower in deep sluggish channels and faster in broad shallow riffles. Attached plankton on stream bottoms plays a large part in bacterial destruction.

HOSKINS, J. K. Bacterial Purification Rates in Polluted Water. Pub. Health Rep. 50, 12:385 (Mar. 22), 1935.

About Measles Prophylaxis—Measles infection probably depends upon the degree of exposure (as do other infections). If this is so, there is danger of jumping to erroneous conclusions about the prophylactic value of usual doses of adult blood which protect under hospital conditions.

KARELITZ, S., and SCHICK, B. Epidemiologic Factors in Measles Prophylaxis. J.A.M.A. 104, 12:991 (Mar. 23), 1935.

School Health Administration—Student health records used in the schools of a Michigan City as they are integrated into school health programs are presented in interesting detail to indicate that they are purposive, educational, scientific and practical.

KLEINSCHMIDT, E. E. Purpose and Function of School Health Records. Pub. Health Rep. 50, 9:281 (Mar. 1), 1935.

"Tuberculosis Causes Tuberculosis"—Case finding and case control

in tuberculosis are presented simply and clearly so that every sanitarian may quickly grasp the essentials of the epidemiology of the disease. Thus is left no excuse for half-hearted, lop-sided control programs.

KLEINSCHMIDT, H. E. Controlling Tuberculosis. Pub. Health Nurs. 27, 3:129 (Mar.), 1935.

What Makes a Good Public Health Nurse?—An account of the panel session held at the Pasadena, Calif., A.P.H.A. meeting last September and the conclusions reached on the qualifications for public health nursing.

MACDOUGALL, E. F. What Is the Most Important Quality for Success in a Public Health Nurse? Illinois Health Messenger, 7, 5:45 (Mar. 1), 1935.

A Bird's Eye View of Public Health Nursing in This Country—Pointing out trends in public health nursing at the present time and making recommendation in regard to future developments.

McIVER, P. Public Health Nursing in the United States. Illinois Health Messenger, 7, 5:45 (Mar. 1), 1935.

Protecting against Measles—Measles is most dangerous to children under 2. Every effort should be made to keep them from contact with cases. If they are exposed, they should be given protective doses of convalescent measles serum. Pooled adult serum or whole blood from parents may be substituted when convalescent serum is not available.

MEADER, F. M. Serum Prophylaxis for Measles. Am. J. Nurs. 35, 3:199 (Mar.), 1935.

Why Maternal Deaths Continue—Highlights from a study of a nationwide sampling of maternal deaths reveal that one-fourth of the total followed abortions, that 4 out of 5 had poor or no prenatal care. Though there has been a reduction of about 1

per cent a year in maternal deaths in those states reporting since 1921, much remains to be done.

ROTHERI, F. C. New Light on Maternal Mortality. *Med. Women's J.* 42, 3:59 (Mar.), 1935.

Public Health in Nursing Schools—A good exposition of ways the nursing school can better prepare students for the preventive aspect of nursing care.

STIMSON, M. What the Community Expects of Nurses Doing Public Health Work. *The Bulletin (Massachusetts State Nurses' Assn.)* 4, 1:5 (Mar.), 1935.

Causes of Congenital Deafness—The suggestion is made that the administration of quinine to the mother during the prenatal period may be responsible for deafness in the baby. (The salicylates and alcohol may also be dangerous.) It is proposed to get the history of all mothers of deafened infants.

TAYLOR, H. M. Further Observations on Prenatal Medication as a Possible Etiologic Factor of Deafness in the New-born. *South. M. J.* 28, 2:125 (Feb.), 1935.

Protection against Diphtheria—In Leeds (Eng.) 8 of the 13 serum-treated cases of diphtheria gave a negative Schick reaction at the time of the onset of illness. Blood titration of these cases indicated that 5 of these should have been definitely immune (according to the accepted standard of antitoxin level of immune subjects). Non-immunized children enjoyed a diphtheria rate of 11 per 1,000. Among the immunized the rate was 5.4 per 1,000.

UNDERWOOD, E. A. Schick Immunity and Diphtheria Infection. *Lancet*, 1, 7:364 (Feb. 16), 1935.

Nursing Administration and Problems—An eloquent description of the whole scope and purpose of public health nursing is this testimonial to the service of the National Organization in promoting this essential part of the public health administrative structure.

WINSLOW, C.-E. A. National Health Challenges—How the Public Health Nurse Is Meeting Them. *Pub. Health Nurs.* 27, 3:120 (Mar.), 1935.

BOOKS RECEIVED

HEALTH CENTER DISTRICTS, NEW YORK CITY. Handbook Statistical Reference Data, Five Year Period 1929-1933. (3rd ed.) Compiled by Godias J. Drolet and Marguerite Prudence Potter. New York: Committee on Neighborhood Health Development, Dept. of Health. 1935. 140 pp. Price, \$1.00.

THE SINGLE WOMAN. A Medical Study in Sex Education. By Robert L. Dickinson and Lura Beam. Baltimore: Williams & Wilkins, 1934. 469 pp. Price, \$5.00.

THROUGH THE PATIENT'S EYES—HOSPITALS, DOCTORS, NURSES. By Sister John Gabriel. Philadelphia: Lippincott, 1935. 264 pp. Price, \$1.50.

MODERN MOTHERHOOD. By Claude Edwin Heaton. New York: Farrar & Rinehart, 1935. 271 pp. Price, \$2.00.

WHAT YOU SHOULD KNOW ABOUT HEART DISEASE. By Harold E. B. Pardee. (2d

ed.) Philadelphia: Lea & Febiger, 1935. 127 pp. Price, \$1.50.

COMMON SENSE FOR MOTHERS. By Mrs. John S. Reilly. New York: Funk & Wagnalls, 1935. 380 pp. Price, \$2.00.

IDEAL HEALTH, OR THE LAWS OF LIFE AND HEALTH. By Alexander Bryce. (3d ed.) Baltimore: Williams & Wilkins, 1935. 340 pp. Price, \$2.00.

WHAT ABOUT ALCOHOL? By Emil Bogen and Lehmann W. S. Hisey. Los Angeles: Angelus Press, 1934. 112 pp. Price, \$1.50.

HEALTH EDUCATION IN SENIOR HIGH SCHOOLS. By Dorothy Ruef. New York: Teachers College, 1934. 106 pp. Price, \$1.50.

DR. MALLORY. By A. L. Hart. New York: Norton, 1935. 320 pp. Price, \$2.50.

BIOLOGY FOR EVERYMAN, VOLS. I AND II. By Sir Arthur Thomson. New York: Dutton, 1935. 1561 pp. Price, \$5.00.

Media Suggested as Substitutes for the Standard Nutrient Agar Used in Routine Milk Control Work

ROBERT S. BREED, PH.D., F.A.P.H.A. (*Life Member*)

New York State Agricultural Experiment Station, Geneva, N.Y.

WHEN the first Standard Methods of Milk Analysis report was drawn up by the American Public Health Association in 1910,¹ the committee in charge of the work made many comparisons between nutrient agars then in use before selecting a beef infusion agar as standard. At the time that this agar was selected, there was much opposition to this choice because it was an inconvenient and expensive agar to prepare and because variations in composition occurred when it was prepared in different laboratories. Beef extracts were also being used extensively at that time. Soon afterward² the Laboratory Section of the American Public Health Association took action replacing the meat infusion agar with a plain peptone-beef extract agar because it was cheaper and more easily prepared. This has since been generally known as standard nutrient agar.

Later,³ the amount of peptone used was reduced from 10 gm. to 5 gm. per liter, and the amount of beef extract from 5 gm. to 3 gm. per liter. At the time that beef extract agar was selected, it was generally thought that this agar would develop a reasonably constant proportion of the total number of bacteria present. Soon after the war period, partially perhaps because of the use of American made peptones, it was found that certain types of bacteria grew so

poorly on so-called standard nutrient agar that the colonies produced were of very small size and difficult to count. The term "pin-point" colonies came to be used in connection with these organisms. The tiniest of these colonies in raw milk have generally been found to belong to the streptococci. Ordinarily they are the streptococci causing bovine mastitis. In pasteurized milk, these bacteria were sometimes streptococci so heat resistant that they were capable of surviving pasteurization temperatures. In other cases, these pin-point colonies were produced by spore-forming types known as facultative and obligate thermophiles. Some of the latter are actually capable of growth in the milk in the holding vats during pasteurization.⁴

As bacteria that do not grow readily on the ordinary standard agar are only occasionally present in milk samples, and as they frequently do not develop visible colonies, this condition of affairs leads to gross errors in the bacteria counts made on standard nutrient agar when these bacteria are present. Recently conveniently available and reasonably cheap materials have been developed which are capable of growing all of these types of bacteria when added to ordinary agar. For this reason it has seemed desirable to attempt to develop a new nutrient agar for use in Standard

Methods of Milk Analysis. Such an agar has been developed by Bowers and Hucker who have reported the results of their studies in a recent publication.⁵ As this new agar is so promising, it is hoped that milk control laboratories will prepare some of it for use in a series of comparisons with ordinary standard agar in order that they may determine for themselves the advantages of the newly proposed medium.

It will be noted that the new medium contains a small amount of glucose. It has been known for many years that the addition of lactose or glucose to standard agar tends to develop larger and more easily counted colonies (Sherman, 1916, and others).⁶ Europeans also have frequently favored the use of a sugar in media of this type.

In recent years there has been in Europe a greatly increased interest in the development of an agar similar to the standard agar used in North America for use in routine milk control work. In England particularly, a committee is engaged at the present time in a study of this problem. One of the suggestions that has been developed in that country is the use of 0.5 per cent to 1.0 per cent skim milk in standard nutrient agar. The skim milk seems to add certain nutrient materials that are very desirable and it is normally easily obtainable.

Some German authorities⁷ are urging an international standardization of laboratory methods for the examination of milk by the International Dairy Congresses sponsored by the International Dairy Federation of Brussels, Belgium. German bacteriologists have tentatively recommended the use of a lactose-peptone-meat extract agar which is to be incubated at 30° C.

As there is an advantage in the use of a common agar for this work throughout the world, an effort is being made at the present time to bring about coöperative international studies that

we hope may result in the adoption of common standard agar.

The formula of two agars that have been suggested as substitutes for the present standard nutrient agar are as follows:

I. *Tryptone Glucose Skim Milk Agar*—Developed by C. S. Bowers, New Britain, Conn., and G. J. Hucker, Geneva, N. Y. The preparation and the composition of the medium* is as follows:

Tryptone (Difco)	5 grams
Glucose	1 gram
Agar	15 grams
Skim milk (fresh)	5 c.c.
Distilled water	1,000 c.c.

The Tryptone (hydrolyzed casein, obtainable from Digestive Ferments Company, Detroit, Mich.) and glucose dissolve immediately in the distilled water without the aid of heat. The agar is then added and melted in an Arnold sterilizer. (An open flame with constant stirring, or other methods, could undoubtedly be used, but the Arnold was utilized in order to dispense with the constant attention necessitated when an open flame is used.) Five c.c. per liter of *good quality* skim milk are then added, and the heating continued for about 5 minutes to insure a thorough distribution of the milk throughout the agar.

Sterilize in autoclave 20 minutes at 15 lb. pressure.

Prolonged heating in the autoclave should be avoided.

The final reaction should be approximately pH 6.6.

As American laboratories may also wish to try the English modification of standard agar, detailed directions are given below as received from England.

II. *English Modification of Standard Agar*—Primarily developed at the Dairy Research Institute, Reading, England, and in the Laboratories of the United Dairies, London England.⁸

(Procedure used in America)

Prepare standard nutrient agar as usual, adding 5 c.c. of *good quality* skim milk per 1,000 of agar just before autoclaving.

* Obtainable in dehydrated form, skim milk and distilled water to be added later. Digestive Ferments Company, Detroit, Mich.

(Procedure used in England as suggested by
L. J. Meanwell, London)

Beef Extract (Lemco).....	3 grams
Peptone (British Drug Houses)*..	5 grams
Shredded agar	15 grams
Raw milk	5 c.c.
Distilled water	1,000 c.c.

1. Weigh out agar and place in muslin bag. Wash in running water until required (15-30 min.).

2. Dissolve beef extract and peptone in distilled water, in the steamer for 3 hours.†

3. Adjust reaction at room temperature to pH 6.8, using brom thymol blue as indicator.

4. Squeeze out excess water from washed

* It has been found B.D.H. Peptone gives a clearer medium than other brands that have been tried.

† Although the Lemco and peptone dissolve very readily, the extra period in the steamer prevents a cloudy mixture.

agar, and add together with 5 c.c. of raw milk to Lemco-peptone broth.

5. Autoclave at 15 lb. for 20 minutes.

6. Filter immediately through paper pulp (Whatman No. 3) in Buchner funnel.

7. Adjust reaction to pH 6.7.

8. Tube into 10 c.c. quantities, autoclave at 15 lb. for 20 minutes.

The final reaction should be pH 6.6.

REFERENCES

1. *Am. J. Pub. Hyg.*, 6:315-345, 1910.
2. *A.J.P.H.*, 5:64, 1915.
3. *A.J.P.H.*, 6:1315-1326, 1916.
4. New York Agric. Exper. Station *Tech. Bull.* 191, 1932.
5. *A.J.P.H.*, 24:396-484, 1934, and New York Agric. Exper. Station *Tech. Bull.* 228, 1935.
6. *J. Bact.*, 1:481-488, 1916.
7. Demeter, K. F. See Preface, *Bakteriologische Untersuchungsmethoden*, 111 pp. Urban and Schwarzenberg, Berlin, 1934.
8. Also see Guide to the conduct of clean milk competitions. *Bull.* 46, 9-11, Ministry of Agric. and Fisheries, London, 1934. (Obtainable through British Library of Information, 5 East 45th Street, New York, Cost 10 cents.)

Our Front Window

CHEMISTS of the nation will do themselves proud this month when they celebrate 300 years of the development of chemical industry in this country. It all harks back to John Winthrop, Jr., first colonial governor of Connecticut, who in 1635 mapped out an ambitious program for production of salt, iron, glass, potash, tar, black lead, saltpeter, medicines, copper, alum, and other chemicals. Winthrop was son of the Pilgrim governor of the Massachusetts colony. He was first to import

chemical apparatus for a laboratory.

And to think that in his day men believed that the way to cure a bayonet wound was to rub the medicine on the bayonet! Three hundred years is not a long time, if you think in terms of geology, or even of man's little day upon this planet. In the past 300 years, pharmacy has come all the way from the alchemist and the magician. We'll bet our descendants 300 years hence will think we were old fogies, too.—*Am. Druggist*, Apr., 1935, p. 10.

ASSOCIATION NEWS

SIXTY-FOURTH ANNUAL MEETING

MILWAUKEE, OCTOBER 7-10, 1935

Headquarters: Hotel Schroeder

SCIENTIFIC EXHIBITS AT MILWAUKEE

MEMBERS of the Association are invited to present new, interesting, or important material for the 3rd Annual Scientific Exhibit to be held in conjunction with the 64th Annual Meeting of the American Public Health Association.

Two special features are offered by the Scientific Exhibits Committee this year. The first, which has been welcomed by section program committees, is the opportunity for authors on the scientific program to illustrate their papers with exhibits in the scientific exhibits. In many instances, interesting charts, graphs, apparatus, or materials relating to a programmed paper cannot be easily displayed at a section meeting. Sometimes the crowded program prevents delegates from examining such illustrative material. The scientific exhibit offers to authors a chance to present such illustrative material—thus making it available to those in attendance during the entire period of the meeting.

The second feature which the committee hopes to offer is an exhibit from Great Britain. The Royal Sanitary Institute, at the invitation of the Scientific Exhibits Committee to sponsor an exhibit from Great Britain, has appointed a committee of its Council to consider the matter with other public health organizations in Great Britain.

Although standard requirements for exhibitors are developing, the com-

mittee has not for this year established any requirement that would exclude any appropriate exhibit in the public health field. It is assumed that most exhibits offered will fall into one of the following classifications:

1. Devices developed by laboratories, health officers, and others for economy or efficiency in their work. Several interesting exhibits of this nature were shown last year under the general heading of "Gadgets."

2. Documents, charts, books, photographs, and other material of a historical nature relating to some phase of pioneer public health work.

3. Statistical or research data or technic, illustrating results or methods of recent study of public health problems.

4. Organization and procedure, particularly in the field of administration and inter-organization relationship dealing either with special programs or campaigns or routine activities of especial interest or merit.

5. General activities, services, and material available for and of interest to public health workers. Exhibits of the national voluntary organizations will be principally included in this group.

This grouping is not set up as an iron-clad classification into which all exhibits must be fitted. It is offered as a suggestion of types of acceptable material.

The Scientific Exhibits Committee reserves the right to accept or decline any exhibit offered to it—if it does not feel that the exhibit meets the requirements of the committee or does not come up to A.P.H.A. standards.

A new feature of the exhibits this year will be the award of honorable

mention to exhibits that show particular merit especially in their presentation. These citations of merit are not limited in number and will be awarded to all exhibits selected for the purpose by the committee. Citations will be reported to the Governing Council of the Association and to the membership through the *Journal*.

LABORATORY SCIENTIFIC EXHIBITS

THE Chairman of the Committee on Scientific Exhibits of the Laboratory Section, requests that members of the section submit material for a laboratory exhibit at the Milwaukee meeting as soon as possible.

It is desired to show the newer technical procedures in so far as they may be practically demonstrable and such other laboratory methods and apparatus as are of current interest.

Communications should be addressed to the *Chairman*, Dr. Fred O. Tonney, Director, Technical Service and Research, Board of Health, Chicago, Ill.

Personnel of Committee

FRED O. TONNEY, *Chairman*
 MAJOR A. PARKER HITCHENS
 M. H. MCCRADY
 RUTH GILBERT

Members of the Association, or their associates who have material of interest for exhibit to the members of the public health profession, may secure application blanks and further information from Homer N. Calver, Chairman, Committee on Scientific Exhibits, American Public Health Association, 50 West 50th Street, New York, N. Y.

ROYAL INSTITUTE OF HYGIENE

DR. ATWATER is pleased to announce the appointment of John L. Rice, M.D., Health Commissioner of New York City, Fellow of the Association, as representative of the A.P.H.A. at the forthcoming Health Congress of the Royal Sanitary Institute, to be held at Bournemouth, England, July 15-20.

Sandor Horwitz, M.D., Health Officer of Peoria, Ill., will also attend the Bournemouth Congress, not only as a Fellow of this Association but also as the representative of the Illinois Department of Public Health.

SOUTHERN BRANCH MEETING

THE Southern Branch of the American Public Health Association will meet in St. Louis, Mo., November 19 and 20, 1935.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Robert M. Bardin, M.D., Box 448, Rutherfordton, N. C., Rutherford County Health Officer
 Osborne E. Carr, M.D., 901-4th Ave. E., Owen Sound, Ont., Canada, Medical Officer, Sydenham Township
 F. R. Nicholas Carter, M.D., Health Department, South Bend, Ind., Health Officer
 Edwin G. Clark, M.D., Criminal Court Bldg., Nashville, Tenn., Assistant Health Officer, Davidson County
 Owen C. Fisk, M.D., Department of Health, Cincinnati, O., Acting Commissioner of Health

Wendell A. Jones, M.D., Court House, Riverside, Calif., City and County Health Officer
 Frederick W. Morse, Health Department, Haverhill, Mass., Agent, Board of Health
 John C. Neale, Jr., M.D., Health Department, Richmond, Va., Henrico County Health Officer
 Thomas F. O'Brien, M.D., 622 Broadview Terrace, Hartford, Conn., Deputy Superintendent of Health

Laboratory Section

Paul J. Beard, Ph.D., Bacteriology Dept., Stanford University, Calif., Assistant Professor of Sanitary Sciences

Elizabeth T. Mathewson, 1208 S. 8th St., Sheboygan, Wis., Supervisor, State Cooperative Laboratory of Hygiene

Stuart Mudd, M.D., University of Pennsylvania Medical School, Philadelphia, Pa., Professor of Bacteriology

Gustave A. Ootmar, M.D., Okanayan Union, B. C., Canada, Medical Health Officer, Kelowna Health Unit; Director, Provincial Board of Health Laboratories

Maurice F. Schlesinger, 47 Third Ave., New York, N. Y., Laboratory, Bendiner & Schlesinger

Clifford N. Stark, Ph.D., Dept. of Dairy Industry, Cornell University, Ithaca, N. Y., Professor of Bacteriology

Vital Statistics Section

Joseph Berkson, M.D., D.Sc., Mayo Clinic, Rochester, Minn., Head of Department of Statistics

John R. Miner, Sc.D., 1901 E. Madison St., Baltimore, Md., Associate Professor of Biology, School of Hygiene & Public Health, Johns Hopkins University

Charles A. Taylor, Life Insurance Company of Virginia, Richmond, Va., Life Insurance Actuary

Public Health Engineering Section

Henry C. Lane, 3154 N. Sawyer Ave., Chicago, Ill., Junior Assistant Sanitary Engineer, Board of Health

William V. Leonard, Dept. of Public Welfare, Boise, Idaho, State Chemist and Sanitary Engineer

Industrial Hygiene Section

Thomas E. Lightfoot, 1022 Koopers Bldg., Pittsburgh, Pa., Engineer in Charge of Accident Prevention and Compensation, Koopers Coal & Transportation Co.

Bernice A. Strange, R.N., American Can Co., Richmond, Va., Industrial Nurse

Food and Nutrition Section

Benjamin R. Allison, M.D., 26 Ives Rd., Hewlett, L. I., N. Y., Practicing Physician

Bess Exton, C.P.H., 1001 Begole St., Flint, Mich., Executive Secretary, Genesee County Tuberculosis Assn.

Richard C. Johnson, City Hall, Albert Lea, Minn., City Health Inspector

William T. Murray, 3 Commercial St., Boston, Mass., Frosted Foods Sales Corp.

Child Hygiene Section

Louis Judelsohn, M.D., 147 Brunswick Blvd., Buffalo, N. Y., Pediatrician

Dr. Abraham B. Schwartz, 2018 E. North Ave., Milwaukee, Wis., Chairman, Child Welfare Committee, Milwaukee County Medical Society

Public Health Education Section

C. W. Kammeier, 610 Flynn Bldg., Des Moines, Ia., Executive Secretary, Iowa Tuberculosis Association

George A. Skinner, M.D., 552 S. 58th St., Omaha, Nebr., Professor of Public Health, University of Nebraska Medical School

Public Health Nursing Section

Anna E. Akerfelt, 2 Philemon St., Bridgeport, Conn., School Nurse

Dorothy M. Concannon, R.N., 2 Elam Ave., Miami, Ariz., Rural Health Nurse

Epidemiology Section

Samuel Frant, M.D., 1605 Nelson Ave., New York, N. Y., Chief, Division of Epidemiology, Bureau of Preventable Diseases, New York City Dept. of Health

Edward M. Holmes, Jr., M.D., State Health Dept., Richmond, Va., Assistant State Epidemiologist

Winston H. Tucker, M.D., Ph.D., 539 S. Grand Ave., W., Springfield, Ill., Assistant Epidemiologist, State Dept. of Public Health

Unaffiliated

Cecil K. Drinker, M.D., S.D., 55 Shattuck St., Boston, Mass., Acting Dean and Professor of Physiology, Harvard School of Public Health

Eleanor E. Kelly, 15 Short St., Brookline, Mass., Supervisor of Social Service, State Dept. of Public Health

DECEASED MEMBERS

George H. Bigelow, M.D., Boston, Mass., Elected Member 1923, Fellow 1929

Kathryn Schulken, R.N., Denver, Colo., Elected Member 1931, Fellow 1934

J. A. Chevigny, M.D., Hammond, Ind., Elected Member 1931

Marguerite J. Clancy, R.N., Asbury Park, N. J., Elected Member 1926

J. H. Kuser, M.D., San Rafael, Calif., Elected Member 1920

G. H. Sherman, M.D., Detroit, Mich., Elected Member 1918

NEWS FROM THE FIELD

SUMMER SCHOOL COURSES IN PUBLIC HEALTH

While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.

American National Red Cross

Courses in Teacher Training for Home Hygiene Instructors:

University of California, Los Angeles,
Calif.—June 22–August 2

Colorado State College, Fort Collins,
Colo.—July 13–August 23

Peabody College, Nashville, Tenn.—June
10–July 17

Pennsylvania State College, State College,
Pa.—July 1–August 9

Syracuse University, Syracuse, N. Y.—July
8–August 16

University of California, Berkeley, Calif.

June 24–August 2

General Bacteriology

Child Development and Training

History of Nursing

Principles and Practice of Public Health
Nursing

Elementary Epidemiology *

Elementary Public Health *

* These two courses are offered in our
Inter-session, May 13–June 21

The Catholic University of America, Washington, D. C.

June 28–August 8

Child Study

Nursing Education

Social Work

Sociology

Columbia University

DeLamar Institute of Public Health,
College of Physicians and
Surgeons, New York, N. Y.

June 10–28

School Health Supervision—Medical In-

spection, Mental Hygiene, and Physical
Education.

Teachers College, New York, N. Y.

July 8–August 16

Organization of Health Education in Public
Schools

Child Hygiene

Health Education

Health and Physical Education

Health Care of Children

Home and Community Hygiene

Nutrition and Health

Personal Hygiene

Public Health Nursing

Public Health Administration

Safety Education Materials and Methods

School Nursing

Teaching Lip-Reading

Sight Saving Classes

Health Problems and Protective Care

Social Hygiene

Cornell University, Ithaca, N. Y.

July 8–August 16

Physical Education:

Gymnastics (Women)

Playground Activities and Adult Recrea-
tion (Men and Women)

Health Education:

Mental Hygiene of Childhood

School Health Problems

Duke University, Durham, N. C.

June 7–August 18

Materials and Methods in Health Education
Personal and School Hygiene

University of Illinois, Urbana, Ill.

June 17–August 10

Physical Education

School Program of Physical Education

School Program in Health

Corrective Gymnastics
Physical Education Program for High Schools
Theory and Practice of Training
Community Recreation
Theory and Technic of Sports for High School
Student Personnel Administration

State University of Iowa, Iowa City, Iowa

June 7–August 22

Nursing
Nutrition
Physical Education

Johns Hopkins University, Baltimore, Md.

June 24–August 3

Subject Matter of Health Education—
Personal Hygiene
Subject Matter of Health Education—
Public Hygiene

Massachusetts Institute of Technology,
Cambridge, Mass.

July 8–August 16

Bacteriology

June 11–July 23

Biochemistry

Michigan State College, East Lansing, Mich.

June 17–July 26

General Bacteriology
Medical Biology Courses
Pathological Bacteriology
Personal Hygiene
Sanitary Science

University of Michigan, Ann Arbor, Mich.

June 24–August 3

General Hygiene and Public Health
Mental Hygiene
Child Hygiene
School Health Problems
Methods and Materials in Health Education
Principles of Public Health Nursing
Administration and Organization of Public Health Nursing
Applied Nutrition
Community Health Problems and Epidemiology
Public Health Statistics

Public Health Law and Administration
Rural Hygiene
Industrial Hygiene
Race Hygiene
Physiologic Hygiene
Public Health Microbiology
Public Health Laboratory Methods
Case Method in Social Treatment
Water Works (C.E. 30)

University of Minnesota, Minneapolis, Minn.

June 17–July 27

Public Health

University of New Mexico, Albuquerque, N. M.

June 8–August 3

Community Health
Educational Hygiene
Personal Health

New York University, New York, N. Y.

July 9–August 16

Child Hygiene
Methods of Teaching for Health
Organization of School Nursing
Mental Hygiene
Field Work in Mental Hygiene
Principles of Public Health Nursing
A Survey of Physical Defects in Children
Application of the Physical Agents to Meet Individual Needs
Observation and Practice in Public Health Nursing
Safety Procedures in Physical Education Activities

Northwestern University, Evanston, Ill.

June 24–August 16

Personal Hygiene
Organization and Supervision of Health Programs
Physical Education for Elementary Teachers

Rutgers University, New Brunswick, N. J.

July 1–August 9

First Aid
Public Health

Smith College—School for Social Work,
Northampton, Mass.

July 3–August 28

Health and Disease
Child Development and Hygiene
Social Aspects of Medicine

Springfield College, Springfield, Mass.

July 1–August 2

Character Education and Human Relations
Physical Education:
Physiology
Corrective Gymnastics

Stanford University, Stanford University, Calif.

June 20–August 31

Physical Education and Hygiene

Syracuse University, Syracuse, N. Y.

July 8–August 16

Public Health Nursing
Methods in Teaching Home Hygiene
Case Studies in Public Health Nursing
Mental Hygiene
Psychology
Public Speaking
Nutrition
Health Education for Classroom Teachers
Child Psychology

University of Virginia, University, Va.

June 17–July 27 (First Term)

July 29–August 31 (Second Term)

Anatomy of the Human Nervous System
Bacteriology, Medical
Biochemistry
Education
Mental Hygiene
Nursing Education

Washington University, St. Louis, Mo.

June 17–July 26

Sociology and Social Work
Education
Psychology
Nursing
Public Speaking
Principles of Public Health Nursing
Methods in Health Teaching

University of Washington, Seattle, Wash.

June 19–July 26 (First Term)

July 29–August 29 (Second Term)

Nutrition
Bacteriology
Physical Education Methods
Principles of Physical Education
Introduction to Public Health Nursing
Principles of Public Health Nursing
Supervision in Physical Education
Principles in Health Education

*Organization and Administration of Physical Education**University of West Virginia, Morgantown, W. Va.*

June 12–August 29

Organization and Administration of Physical Education
Playground and Community Recreation
Public School Health
Problems in Physical Education

Western Reserve University, School of Applied Social Sciences, Cleveland, Ohio

June 24–August 2

Summer Program in Public Health Nursing:
Principles of Health Teaching
Principles of Public Health

University of Wisconsin, Madison, Wis.

July 1–August 9

Anatomy
Bacteriology
First Aid to the Injured
Tests and Measurements in Physical Education
Health Education in Schools
Play, Recreation and Leisure Time Problems
Physical Examinations and Therapeutics

SIGHT SAVING CLASSES

COURSES for the training of teachers and supervisors of sight-saving classes will be offered as follows:

Western Reserve University, Cleveland, Ohio—June 24 to August 2.

State Teachers College, Buffalo, N. Y.—July 1 to August 9.

Teachers College, Columbia University, New York City—July 8 to August 16.

Details may be obtained from the university or college or from the directors in charge.

Olive S. Peck, Supervisor of Sight-Saving Classes of Northern Ohio, Board of Education, Cleveland, Ohio

Matie M. Carter, Supervisor of Sight-Saving Classes, State Education Department, Albany, N. Y.

Winifred Hathaway, Associate Director, National Society for the Prevention of Blindness, 50 West 50th Street, New York City.

GRANT FOR DENTAL RESEARCH

CONTINUANCE of a dental research project in Yale University School of Medicine has been made possible through a grant of \$17,500 by the Carnegie Corporation of New York. This program, instituted in July, 1929, under a grant of the Rockefeller Foundation, is an intensive study of the teeth in relation to the body in general by physicians, radiologists, bacteriologists, pathologists, and dentists.

Connected with this project is the recent formation of the Dental Clinic Society, which provides more than 500 treatments monthly for indigent patients. The society has its own professional staff but is conducted in close coöperation with the dental study group and community social agencies.

TESTING OF FILTER-TYPE RESPIRATORS

IN view of the increasing importance of the problem of dust control in mining and other industries, and in line with its policy of testing respiratory protective equipment for permissibility for use in mines and in the mineral industry, the U. S. Bureau of Mines, Department of the Interior, has formulated a series of tests for determining the efficacy of filter-type respirators designed for use against mechanically generated dusts, fumes of various metals, and mists. These tests are described in *Schedule 21*, "Procedure for Testing Filter-Type Dust, Fume, and Mist Respirators for Permissibility."

NEW WING TO MARINE HOSPITAL

A NEW five hundred thousand dollar addition to the U. S. Marine Hospital of Chicago was dedicated recently, with Surgeon General Hugh S. Cumming, F.A.P.H.A., of the U. S. Public Health Service, Washington, D. C., presiding at the ceremonies. The hospital was founded in 1873.

CANCER PROGRAM IN ONTARIO

A NEW cancer commission for the province has been named by Dr. James A. Faulkner, newly appointed Minister of Health for Ontario, to continue a cancer program begun several years ago. Three clinics have already been established in Toronto, Kingston, and London, with an expenditure of \$300,000 on radium.

ACCIDENTAL DEATHS IN 1934

ACCIDENTS of all kinds took 99,000 lives in the United States last year, according to preliminary estimates just announced by the National Safety Council. More than a third of the deaths occurred in traffic, another third in homes, and the remainder in occupational and public accidents.

The total death figure for 1934 represents an increase of 8.7 per cent over 91,087 deaths recorded in 1933 and approximates the all-time high of fatal accidents reached in 1930, when there were 99,300 deaths.

Motor vehicle accidents were responsible for the largest proportion of the grand total—35,500 fatalities. This total was 13 per cent above 1933 and well above the previous all-time high of 33,675 in 1931.

Home accident deaths jumped from 30,000 in 1933 to 33,000 last year. Occupational deaths are estimated at 15,500, an increase of 1,000 over 1933.

The new record of traffic deaths, an increase of 4,000 in a single year, is only partially accounted for by increased auto travel. Gasoline consumption, the best index of travel, increased only about 7 per cent.

The increase in fatal accidents was general throughout 1934; every month showed a higher death total than the corresponding month of 1933. The first six months, however, were especially disastrous, showing an increase of 21 per cent.

Increases in motor vehicle deaths were much greater in rural areas than in the city. Pedestrian fatalities increased less in 1934 than other types of traffic accidents, but they still average between 60 and 65 per cent of motor vehicle deaths in cities.

The cities showing decreases in auto deaths were: San Francisco, with a drop of 15 per cent from 1933; Pittsburgh, 13 per cent; Milwaukee, 8 per cent; New York, 1 per cent.

FEDERAL DIVISION OF VITAL STATISTICS

THE third regional conference of the Division of Vital Statistics of the Federal Bureau of the Census with registration officials was held in Albany on March 22. Nine of the 10 northeastern states comprising the conference territory were represented. The previous conferences were held in Montgomery, Ala., and in Des Moines, Ia.

A. W. H.

WHERE TO FIND QUALIFIED PUBLIC HEALTH NURSES?

THE Joint Vocational Service which is the vocational and placement service of the National Organization for Public Health Nursing with headquarters at 130 East 22nd Street, New York, N. Y., on January 1, 1935, had 524 candidates, scattered over the whole country, listed for placement in the public health nursing field. The Service has professional histories and credentials of these nurses on file and can give helpful service to those seeking good public health nurses.

E. F. M.

LIBRARY OF AMERICAN STUDIES IN ITALY

THE Library for American Studies in Italy, through Dr. Giovanni Perilli, Via Cunfida 35, Roma (48), announces its intentions of extending, for the benefit of American and Italian readers, its section of medical books and periodicals. It requests contributions of publications from the members of the A.P.H.A.

MILBANK FUND HEALTH CONFERENCE

THE Milbank Memorial Fund held its annual two-day conference in the New York Academy of Medicine, March 27 and 28. Dr. Livingston Farrand, F.A.P.H.A., President of Cornell University, opened the Conference. There were five simultaneous round-table discussions.

Dr. Thomas Parran, Jr., F.A.P.H.A., New York State Commissioner of Health, presided at the session on Venereal Diseases. Dr. Joseph Earle Moore, of the Syphilis Division of the Medical Clinic at Johns Hopkins University, was one of the discussants.

Those presiding at other sessions were: Dr. Kendall Emerson, F.A.P.H.A., Managing Director of the National Tuberculosis Association, on Health Education; Dr. C.-E. A. Winslow, F.A.P.H.A., Professor of Public Health at the Yale School of Medicine, on Public Health Problems; Professor Robert E. Chaddock, of the faculty of political science at Columbia University, on Population Studies; and Dr. Charles J. Hatfield, Executive Director of the Henry Phipps Institute, Philadelphia, on Tuberculosis Studies.

Dr. Raymond Pearl, F.A.P.H.A., Professor of Biology, School of Hygiene and Public Health at Johns Hopkins, was one of the speakers at the session on Population Studies.

Speakers at the annual dinner, which closed the meeting March 28, were Surgeon General Hugh S. Cumming, F.A.P.H.A., Dr. Simon Flexner, and Josephine Roche.

JOINT DISEASES HOSPITAL MEETING

THE Hospital for Joint Diseases held its Annual Meeting in the Hospital Auditorium, New York, April 22.

Dr. S. S. Goldwater, F.A.P.H.A., Commissioner of Hospitals of the City of New York, addressed the meeting on "The City's Hospitals in Theory and Practice."

LECTURE BY DR. PARRAN

THE Hermann Michael Biggs Lecture this year was given by Thomas Parran, Jr., M.D., F.A.P.H.A., State Commissioner of Health, Albany, N. Y., on May 2, at the New York Academy of Medicine.

NATIONAL TUBERCULOSIS ASSOCIATION
MEETING

A TWO day health education meeting will be held for tuberculosis workers at Saranac Lake, June 21 and 22, 1935. Under the general heading, "Putting Our Knowledge to Work," there will be three round table sessions to discuss subjects as follows:

1. What Are We Trying to Do?
2. What Should Be Taught?
3. How Shall We Teach?

The leaders will be P. P. Jacobs, Harvey Dee Brown and Dr. Iago Galdston. The annual meeting of the National Tuberculosis Association takes place June 24-27.

CENSUS OF UNEMPLOYED

IT is authoritatively stated in Washington (April 1) that if the Employment Relief Bill pending before Congress is adopted, reasonably soon, it is likely that the Federal Relief Administration will allocate funds for a census of unemployment and population, to be taken about October 15. Write to your representatives in Congress and to the Federal Employment Relief Administration in support of the Census if the bill has not been adopted by the time this has been published A. W. H.

SCARLET FEVER THIS YEAR

THE prevalence of scarlet fever in the United States since the beginning of the present calendar year has reached a peak hitherto unattained. Reports received by the U. S. Public Health Service from state health officers record more than 8,000 new

cases for 47 states in 1 week. According to previous experience the peak for the prevalence of scarlet fever has occurred the first week or two in April.

The records above mentioned include only the reports during March. Reports regarding the prevalence of scarlet fever for April are awaited with interest.

GEORGE HOYT BIGELOW

COUNTRY wide search for Dr. George H. Bigelow, in which medical and public health journals took an active part, was brought to a close by the finding of his body in a reservoir in Framingham, Mass., on March 23, 1935. So is ended a brilliant career in public health, and the persistent hope of his family and friends that he would eventually return for further service in the field to which he had made such brilliant contributions.

A physician interested primarily in the social obligations of medicine, Dr. Bigelow early chose public health as the field offering the widest opportunities for service. From an auspicious start as Director of the Cornell Clinics he was called to Massachusetts Department of Public Health in 1923, and it was there during his 10 years as Deputy Commissioner and Commissioner of that department that he developed a quality of state health administration which has been an inspiration to health executives in all parts of the country. As Medical Director of the Massachusetts General Hospital, Dr. Bigelow was again looking toward the broader application of organized medicine to human needs, and his brief career there gave promise of new progress in hospital administration.

Substantial as Dr. Bigelow's contributions were in practically all the accepted fields of public health, he was perhaps best known for his pioneer work in chronic disease control. Believing that public need transcends any

arbitrary classification of disease, he accepted the challenge of a rising cancer toll, and through his vision, courage, and tireless energy, evolved a cancer program which points the way to further progress in that baffling field. That the establishment of such a program led to the awakened interest in cancer on the part of the medical profession, and a substantial increase in the admission of cancer patients to general hospitals all over the state is another tribute to his discrimination and the soundness of his judgment.

The full measure of a man is seldom in his accomplishments, and deep as is the imprint of Dr. Bigelow's work on the field of public health, it is by his personal qualities that he is best remembered. Gifted with a wit and lightness of touch which often masked his seriousness of purpose, his vision and steady courage were a never failing source of inspiration to his friends and associates. A leader who brought to public service a brilliance of mind matched only by his courage and devotion to human betterment, he has set a new beacon in the course of public health. Few in a long life have rendered greater service.

Dr. Bigelow has been a member of the American Public Health Association since 1923, and a Fellow since 1929.

HOUSING BILLS

INDIANA is the 11th state to empower its cities to create public housing authorities. The bill was passed by the Indiana General Assembly prior to its adjournment on March 11.

Alabama became the 12th state to pass such a law in March, when the State legislature approved public housing authorities legislation as recommended by the Legal Division of the Public Works Administration.

Connecticut, with a strong and well organized popular support for public housing legislation, has adopted a sub-

stitute for S. B. 403, which was a draft of the law submitted for approval and recommended by the Legal Division of the Public Works Administration. A shorter bill is now proposed. The shorter bill, which provides for the creation of local public housing authorities, will also set up a state housing board having supervisory control over the operations of the municipal authorities.—*Public Housing Progress*, April 15, 1935.

X-RAY AWARD OFFERED

THE David Anderson-Berry Gold Medal with a sum of money amounting to about £100 will be awarded in July by the Royal Society of Edinburgh to the person who in the opinion of the council has recently produced the best work on the nature of X-rays in their therapeutic effect on disease in human beings.

The secretary of the society is James H. Ashworth, D.Sc., 22 George Street, Edinburgh, 2.

CANCER SURVEY

THE prevalence of cancer in rural areas in Michigan will be determined in a survey to be undertaken by the Michigan State Department of Health under a grant from the U. S. Public Health Service, to include only full time county or district health departments.

COSMETICS REGISTRY LAW

PERMITS must be obtained from the State Department of Health in Maine for the marketing in Maine of cosmetics and beauty culture equipment, under a newly enacted law. This law supplants legislation enacted in 1934 which was invalidated by a Federal Court injunction on the grounds that it regulated interstate commerce.

The new law does not require the submission by manufacturers of their

formulas, or their obtaining a permit for variations of a product because of differences in shade, color, or odor. Household and toilet soaps also are exempted from the cosmetic classification unless they are represented as preparations for the treatment of disease.

Registration costs are fifty cents for each sample. The law also authorizes refusal of registration in instances where products may be regarded as injurious to health.—*Printers Ink*, Apr. 18, 1935, p. 78.

CELLAR HOUSING

FULLY 10,000 of the Harlem (New York) citizenry—the families which cannot pay the high rents nor obtain relief—now live in cellars; dark, damp, cold dungeons, in squalor worse than that of the Arkansas share-croppers.—Rev. A. Clayton Powell, Jr., *Public Housing Progress*, April 15, 1935.

NEW HEALTH OFFICERS IN KANSAS

THE Kansas State Department of Health announces the following appointments of County Health Officers:

Dr. Ernest J. Beckner, Goodland, Sherman County

Dr. Frederick E. Dargatz, Kinsley, Edwards County

Dr. Charles E. Gaston, Frankfort, Marshall County

Dr. Francis D. Kennedy, Norton, Norton County

Dr. James H. A. Peck, St. Francis, Cheyenne County

Dr. William F. Schroeder, Newton, Harvey County

MARYLAND CHILDREN EXAMINED

A TOTAL of 9,749 children were examined in the child health conferences sponsored by the State Department of Health of Maryland in 1934. Of these 2,490 were free from conditions in need of correction; 1,465 were underweight or gave other evidence of malnutrition; 3,492 needed dental attention. Unfavorable conditions of the

lungs were noted in 59, and of the in 245.

In the 651 conferences held, 417 communities were represented. Medical treatments were not given, but children needing care were referred to their own physicians and prompt correction was urged.

ONONDAGA COUNTY

THE Onondaga Health Association of Syracuse, N. Y., has published a pamphlet in the interest of a County Health Department for Onondaga County. The pamphlet carries a study of the present services and proposed budget made by Dr. Philip J. Rafle, District State Health Officer. After analyzing the effect of the tax rate in each municipality and extending the figures to show the change in the tax burden on a small home, the following paragraphs are added which visualize the relative size of per capita costs in a fashion which may be useful to other health departments:

Four cents will buy 2 postage stamps. 10 cents will buy 1 cigar or 1 package of bobby pins. 15 cents will buy 1 movie ticket. 25 cents will buy 2 packages of cigarettes. 50 cents will buy 1 lipstick or 1 box of candy.

. . .
A modern, centralized administration of public health in place of the present obsolete set-up, would give the people in towns and villages greatly increased protection against preventable sickness and death. . . .

Taxpayers would secure 50 per cent State aid and other economic gains. . . .

These benefits can be had for the price of $\frac{1}{4}$ mile of gravel road.

DECENT SHELTER

WE must recognize in this country that every person has a right to decent shelter and that society owes to every child the opportunity to enjoy the health producing sunlight and fresh air and recreation which the slums deny.—Senator Robert F. Wagner, *Public Housing Progress*, April 15, 1935.

A.N.A. OFFICERS

THE Board of Directors of the American Nurses Association, meeting in New York in January, appointed Alma Ham Scott, of Indiana, Director at Headquarters, and Ella Best, of Illinois, Associate Director.

The Board also elected these nurses to the new Board for the *American Journal of Nurses*:

President, Stella Goostray, Boston, Mass.; Secretary, Julia Stimson, Washington, D. C.; Treasurer, Anne L. Hansen, Buffalo, N. Y.; Members: Katharine Densford, Minneapolis, Minn.; Eugenia Kennedy Spalding, Washington, D. C.; Emilie Sargent, Detroit, Mich.; Elizabeth Soule, Seattle, E. F. M.

INTERNATIONAL HOUSING CONGRESSES

THE first of the two international congresses on housing to be held this summer will take place in Prague, Czechoslovakia, June 23-26. This formal meeting will be followed by a study-tour to Hradec Kralove, Zlin, Brno, and Bratislava, for the inspection of the various types of modern housing developments to be found in these communities.

This Prague congress and tour are under the auspices of the International Housing Association, and will be of particular value to all students of the housing problem, who are invited to attend.

The announced topics for formal discussion are: Slum-clearance and elimination of unsanitary dwellings; Technical installations and equipment of small dwellings; and Measures for rehousing the unemployed and part-time workers.

The Fourteenth International Housing and Town Planning Congress will be held in London from July 16 to July 20. Discussion during the 4 days will be under three general heads: Rehousing the people; Positive planning; and

Planned rural development and the preservation of the countryside. Bearing on these three topics, papers will be read to the congress by housing experts from most of the countries in western Europe.

On the afternoons of July 16 and 19, visits have been arranged to the housing schemes of the London area. An all-day visit to the Letchworth and Welwyn Garden cities will be conducted on the 18th. At the conclusion of the congress, those wishing to examine further the English re-housing developments can take a 5 day conducted tour to the cities of Harrogate, York, Leeds, Manchester, Bolton, Liverpool, and Birmingham.

The London congress and the tours are all being arranged under the auspices of the International Federation for Housing and Town Planning.—*Public Housing Progress*, April 15, 1935.

NARCOTIC FARM OPENING POSTPONED

THE opening of the First Narcotic Farm at Lexington, Ky., was expected to take place about April 1. Because the building operations have not progressed as rapidly as had been expected, it has been necessary to postpone the opening of this institution. It is probable that it may be June 1 or later before patients are admitted.

MORE REASONS FOR PASTEURIZATION

DR. S. J. Crumbine's report indicated that 45 milk-borne epidemics had occurred during 1933 in 24 states; according to reports of state health officers, 44 of these epidemics having been traced to raw milk and one to raw cream.

Referring to undulant fever, Dr. Crumbine said:

The four epidemics of undulant fever reported for 1933 and none for 1932 would not seem to indicate a wide distribution of the disease or that it constituted an important health problem in relation to milk. But when we consider the 1,502 cases and 71 deaths re-

ported by the U. S. Public Health Service occurring during the fiscal year 1933, and the other large number of unreported and unrecognized cases that probably occurred, it must be admitted that undulant fever is a health and economic problem of major importance. Infected dairy herds are widely distributed over the United States and Canada, the rate of infection running from 5 to 50 per cent or higher.

If there were additional reasons needed for universal pasteurization of milk, the increasing menace of undulant fever would provide them.

—*Colorado Med.*, 32, 2:115 (Feb.), 1935.

PWA HOUSING PROGRAM

MANY people think of the problem of slum clearance and better housing as one applicable only to the large cities, and have disregarded the need for such work in our smaller towns and villages. The entire question of housing is a problem that concerns not only the large metropolitan areas, but every community in the country. We must look to these smaller areas for the support of the housing program throughout the nation.—B. M. Pettit, Housing Division, Public Works Administration, *Public Housing Progress*, April 15, 1935.

PERSONALS

H. E. KLEINSCHMIDT, M.D., Fellow A.P.H.A., Director of Health Education of the National Tuberculosis Association, sailed March 28 to make a study of exhibit building in Germany, the Netherlands, and Austria, by courtesy of the Oberlaender Trust of Philadelphia.

EMERY R. HAYHURST, M.D., PH.D., F.A.P.H.A., is Chairman of the American Committee for the Section on Industrial Diseases, of the Seventh International Congress on Industrial Accidents and Diseases, to be held in Brussels, Belgium, July 22–27, 1935.

WILLIAM B. WELLS, M.D., F.A.P.H.A., of Riverside, Calif., has retired as Health Officer of Riverside City and County on account of ill health. He has been succeeded by Dr. Wendell A. Jones, of Riverside, member A.P.H.A.

RUTH HOULTON, R.N., F.A.P.H.A., a former supervising nurse for the Minnesota Department of Health, and more recently general director of the Minneapolis Visiting Nurse Association, took her place on the staff of the National Organization for Public Health Nursing in March. This addition was made possible because the Organization had just received a special gift from the Commonwealth Fund.

DR. ALLEN C. KRAMER, of Tulsa, Okla., has been appointed Health Officer of Tulsa County, to succeed Dr. Thomas W. Stallings.

CHARLOTTE J. CALVERT, M.D., of Madison, member A.P.H.A., supervisor of the Bureau of Child Welfare of the State Board of Health of Wisconsin since 1929 and a member of the staff since 1925, retired to private life March 1.

DR. WALTER A. STERNBERG, of Mount Pleasant, Iowa, has been appointed a member of the State Board of Health of Iowa, succeeding Dr. Nathaniel M. McKittrick, of Burlington, resigned.

DR. VONANDO G. LOGAN, of American Falls, Idaho, has been appointed Health Officer for Power County, Idaho.

ELDRED V. THIEHOFF, M.D., Fellow A.P.H.A., formerly Acting Director of the Cleveland Child Health Association, has been named Director of Health District No. 7, comprising Gladwin, Arenac, and Clare Counties, with headquarters at Gladwin, Mich.

ETHEL WIGMORE, Librarian of the National Health Library, National Health Council, 50 West 50th Street, New York, will become Librarian of the School of Nursing Library, Bellevue Hospital, on April 15. She has been with the Council for 9 years, and Librarian for 3 years. She was formerly Librarian of Peiping Union Medical College, Peiping, China.

CHARLES A. NEAFIE, M.D., member A.P.H.A., formerly Health Officer of Pontiac, Mich., has been reappointed to that position, filling the vacancy caused by the resignation of Hubert M. Heitsch, M.D., member A.P.H.A.

HUBERT M. HEITSCH, M.D., of Pontiac, Mich., member A.P.H.A., has resigned as Director of Public Health of the City of Pontiac, to accept a position on the medical staff of the new combined Chevrolet and Fisher Body plant at Baltimore, it is stated.

DR. FREDERICK McD. HARKIN has been appointed Health Officer of Marquette, Mich., to succeed Thurman R. Laughbaum, M.D., member A.P.H.A., resigned. Dr. Harkin held the position in 1893.

DR. WILLIAM M. BRIEN, of Orange, N. J., member A.P.H.A., has resigned as First Assistant Medical Examiner of Essex County, to become Health Officer of Orange. His successor is Dr. George P. Olcott, Jr., of East Orange.

HELEN PECK, until recently director of the Infant Welfare Society in Minneapolis, is now Chief Consultant in Public Health Nursing, State Department of Health, Boston, Mass.

RUTH E. STOCKING, M.D., has been appointed to the staff of the Bureau of Child Hygiene and Public Health Nursing of the State Department of Health, Lansing, Mich., to take the place of Dr. Goldie Corneliuson, resigned.

DR. ROY L. CLEERE, of Denver, Colo., has been named a member of the

Colorado State Board of Health, succeeding Samuel R. McKelvey, M.D., of Denver, member A.P.H.A., who had served on the Board since 1911.

DR. HARRY B. SMITH has been appointed Superintendent of Health of West Hartford, Conn., succeeding Dr. Theodore F. Foster, member A.P.H.A., resigned.

HUGH B. SENN, M.D., of Newberry, S. C., member A.P.H.A., has succeeded Guy G. Lunsford, M.D., of Millen, member A.P.H.A., as Health Officer of Jenkins County. Dr. Lunsford resigned to become chief of the Division of County Health Work of the State Department of Health.

DR. GIDEON DOUGLAS WILLIAMS, of Lake Providence, La., Director of the East Carroll Parish Health Unit, has been appointed in charge of the Ouachita Parish Health Unit, succeeding Dr. John W. Williams, of Monroe, member A.P.H.A., who resigned to become Health Director of Asheville, N. C.

DR. JOHN C. MCGUIRE, at times in charge of county health departments in Kentucky, has been named full-time Director of the Copiah County Health Department, succeeding Dr. James T. Googe, member A.P.H.A., who recently resigned to become Assistant Health Director of Florida.

DEATH

LUCY MINNEGERODE, Superintendent of Nurses of the U. S. Public Health Service, died in Alexandria, Va., March 24. She was one of the first Red Cross Nurses to volunteer for overseas duty after the outbreak of the World War. She was decorated by the Czar of Russia for her nursing services at Kief on the Russian front in 1915. Later she was awarded the international Florence Nightingale Medal. She was a graduate of the Bellevue Hospital Nursing School, New York.

MEDICAL TOUR TO RUSSIA

IT is announced that rates have been lowered considerably on the Medical Tour to the U.S.S.R. and the 15th International Physiological Congress, under the sponsorship of Dr. James S. McLester and Prof. A. J. Carlson. Individual itineraries can be arranged. Write the World Exchange, 203 So. Dearborn St., Chicago.

CONFERENCES

- May 4, 5, Spring Meeting of the Michigan Branch of the American Student Health Association, Battle Creek, Mich.
- May 6, 7, 14th Annual Massachusetts Safety Conference, Boston, Mass.
- May 6-10, Annual Convention of American Water Works Association, Cincinnati, Ohio.
- May 12, Mothers Day.
- May 14, 15, 19th Annual Meeting of the Central Atlantic States Association of Dairy, Food and Drug Officials, Richmond, Va.
- May 18, Child Health Day.
- May 20-22, Tenth Annual Meeting of the American Association for Adult Education (66 East 42 Street, New York), Milwaukee, Wis.
- May 24-25, Spring Meeting of New York State Sewage Works Association, Poughkeepsie, N. Y.
- May 31, June 1, Tenth Annual Conference, New England Health Education Association, Cambridge, Mass.
- June 3-5, Twenty-Fourth Annual Meeting, Canadian Public Health Association, in conjunction with the Ontario Health Officers' Association, Canadian Tuberculosis Association, and Canadian Social Hygiene Council. Royal York Hotel, Toronto.
- June 4-9, Annual Meeting, Royal Institute of Health, Harrogate, England.
- June 12, 13, Annual Meeting, Academy of Physical Medicine, Atlantic City, N. J.
- June 9-15, National Conference of Social Work, Montreal, Canada.
- June 10-14, Annual Meeting of the American Medical Association, Atlantic City, N. J.
- June 14, 15, Meeting of State and Provincial Health Authorities, Atlantic City, N. J.
- June 17-19, Ninth Annual Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.
- June 17-19, Semi-Annual Meeting, American Society of Heating and Ventilating Engineers, Royal York Hotel, Toronto, Ont., Can.
- June 19-22, Eighth Health Education Conference of the American Child Health Association, Iowa City, Iowa.
- June 24-27, Annual Meeting of the National Tuberculosis Association, Saranac Lake, N. Y.
- June 24-29, Summer Meeting of the American Association for the Advancement of Science and Associated Societies, Minneapolis, Minn.
- July 1-3, Sixth Annual Meeting, Western Branch American Public Health Association, Helena, Mont.
- July 15-20, Royal Sanitary Institute Health Congress, Bournemouth, England.
- July 22-27, Seventh International Congress on Industrial Accidents and Diseases, Brussels, Belgium.
- July 23-27, International Congress on Life Assurance Medicine, London.
- July 31-Aug. 3, Annual Meeting of the American Dental Society of Europe, London.
- Aug. 10-17, Meeting of Health Section of the World Federation of Education Associations, Oxford, England.
- October 7-10, Sixty-fourth Annual Meeting of the American Public Health Association, Milwaukee, Wis. Headquarters: Hotel Schroeder.
- October 14-18, 24th Annual Safety Congress, National Safety Council, Inc., Louisville, Ky.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

June, 1935

Number 6

Serving the Public for Health*

HENRY F. VAUGHAN, DR.P.H., F.A.P.H.A. (*Life Member*)

Health Commissioner, Detroit, Mich., and Member of Board, W. K. Kellogg Foundation, Battle Creek, Mich.

IT is the obligation of all public health administrators to provide, in an efficient and economical manner, the means of health protection, and at the same time stimulate an interest in the promotion of positive health habits. There are many health officers who will agree with the statement that the participation of all physicians and dentists in the public health and medical services of the community will result in advantages to the individual, the public, and to the health service of the community. There is existent in every area, whether urban or rural, a potential reservoir of medical knowledge and service which can be activated to serve the local health needs. By stimulating these resources, which have lain dormant among the practising physicians and dentists, the spirit of health education can be made to permeate every home and provoke a response on the part of the conscientious parents so that they will do their share to secure modern health benefits for their children.

It is my intention to discuss certain

studies which have been carried on during the past several years in the administrative field for the purpose of increasing the active participation of practising physicians. There is nothing in these studies which detracts from the essentialness of a properly organized local public health service—preferably a whole-time health service with a full-time health officer assisted by adequately trained health educators, public health nurses, technicians, and other personnel which we all recognize as essential to modern health service. Such a health department should be blessed with reasonable financial support and should be organized with the political independence repeatedly recommended by the American Public Health Association, and so admirably emphasized by the Committee on Public Health Organization of the White House Conference on Child Health and Protection. It is axiomatic that the first essential of a program of medical participation is the existence of a properly organized modern public health department.

It is equally important to bear in mind that a program of medical participation should not be limited to one line of approach. It should not be considered merely an effort to secure the

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

protection of all susceptible children against diphtheria, nor should it be an undertaking restricted to the search for the early case of tuberculosis. It should be recognized that the program is broad in its conception and in its application. It should embrace the gradual incorporation into private medical and dental practice of all those services of a preventive character which, in the final analysis, are available only at the hands of the duly licensed professional man. Diphtheria protection has frequently been the first objective in the program, but the administrator should remember that the same principles of procedure apply to smallpox and typhoid fever immunizations; to the provision for the annual health examination; to the search for the early signs of departure from normal health which may indicate tuberculosis, cancer, and heart disease; to the diagnosis, treatment, and control of syphilis; to the provision for health examinations and the promotion of health education among those groups who because of their occupation may prove a particular hazard to public health; and especially to the general promotion of hygienic living habits and the relief of the individual from the physical and mental handicaps which may, if neglected, deprive him of the full enjoyment and maximum utilization of his life.

The studies in Michigan and elsewhere have unfortunately become known primarily as an effort to provide diphtheria immunization, in spite of the fact that from the very beginning we have repeatedly emphasized that this is a program which we hope will ultimately provide a well-rounded health service at the hands of the family physician in coöperation with the health department. The by-products which will gradually develop are more valuable than the initial objective.

It should also be borne in mind that a program which involves the gradual

transfer to the physician's office of some of these services, which in the past have been maintained directly by the health department in clinics, health centers, and dispensaries, cannot be placed in full operation in a short time. It is not a program of a few weeks or even a few months; it is a program of several years. It involves a change of attitude on the part of the administrator, the physician, the organized medical society, and the public. It is not a program which is revolutionary in character. It is the gradual evolution of a procedure embracing the practice of preventive as well as curative medicine by the family physician.

The program involves a three-cornered understanding between the professional group, the local health agency, and the public. The first essential is to prepare the medical profession. It is both reasonable and practical that the professional group should be represented by its organized society, usually the county medical society, which may function through its duly authorized public health committee, this committee's action regularly reviewed and approved by the council and officers of the society. There should be recognition on both the part of the medical society and the health department that they have a common objective—to provide adequate and efficient service for the public. The holding of regular periodic meetings by the public health committee at which there is generous representation from the health department staff, not only establishes a close harmonious relationship but provides a workable administrative unit. The health department should serve as the executive unit to place in operation the plans as developed and adopted by both agencies. Neither the county medical society nor the health department can function with maximum efficiency without the support of the other group.

The medical profession must be pre-

pared in two respects: first, with regard to the group plan, and second, with respect to the technics of the services which are to be rendered. The individual physician must be willing to subscribe to a form of procedure adopted by the organized medical group. He must agree to prepare himself to render the type of service to which the public is entitled; he must understand the value of diphtheria toxoid, the significance of the Schick test, the desirability of giving the tuberculin test and its relationship to the roentgenological examination of the chest, and the health examination. The physician should agree to establish the services in his own office at such times and accept such other arrangements as are incorporated in the group plan.

At the very beginning steps should be taken to acquaint all physicians with the purposes of the program. Failure to do so will result in misunderstandings and in the loss of public confidence. It would be disastrous to urge a parent to send his child of susceptible age to a coöperating physician for diphtheria protection if such physician were unconvinced of the value of prophylactic treatments or if he were not familiar with the technic involved. Months of preparation of the profession may reasonably precede any effort to stimulate public interest.

In the Michigan studies three methods of preparing the physicians have been followed. Postgraduate conferences on preventable diseases designed to attract the physician because of his interest in clinical medicine have been developed and utilized to establish an interest in specific health services. Such conferences have been well attended by the members of the organized medical profession. There is little difficulty in reaching physicians who are wont to attend medical meetings, who belong to the district societies, or who are attached to hospital staffs. There

are, unfortunately, some physicians in every community who rarely if ever attend medical meetings, and in order to reach these the services of a medical coöordinator have been utilized—a physician representing both the health department and the county medical society—who visits the practising physician in his own office, painstakingly outlines the group plan, and demonstrates the services to be rendered. As the program has gradually evolved and expanded from one of mere diphtheria protection into smallpox vaccination, periodic health examinations, and tuberculosis case finding, each added service has been carefully explained and outlined to the coöperating physicians, both in group meetings and by individual visits. The plan has also been explained to the senior students in the medical schools in order that as these new physicians take up their work in the community they may be well informed concerning the program of medical participation. Diphtheria protection was undertaken as the first objective in the Detroit studies. Since 1928 some 1,100 physicians have co-operated, 700 of whom responded when the plan was outlined by letter through the county medical society, and 400 of whom were reached through the medical coöordinator.

After the profession is thoroughly conversant with the group plan the problem resolves itself into one of bringing in contact with the qualified and prepared physician the child of susceptible age who is in need of the preventive service. This requires an application of the tools of health education. The parent must be stimulated to accept his obligation and to secure for his children the services which the coöperating physician is ready and willing to provide in his own office.

Two methods of health education have been employed. Through popular health instruction, which involves all

recognized means of utilizing the printed and spoken word, we were able to secure the protection of about 1 child in 5. We used the radio, radio dramas, billboard advertising, streetcar and motorbus placards, literature distributed through the schools, and we enjoyed the full support of the press with feature stories and editorials. The Health Education Division of the Detroit Department of Health incorporated this program in its routine contact with school children, parents, and the public generally. We realized, however, that to secure the protection of 20 per cent of the children would not suffice. We, therefore, adopted the procedure of reaching the parent through individual health instructions. We have used the public health nurse as the family health adviser.

The public health nurse who has received special training in health education and who at the same time is conversant and sympathetic with the attitude of the medical practitioner, becomes a very potent connecting link between the parent, the child, and the family physician. It is largely through her efforts that the newer knowledge in preventive medicine can be presented to the average citizen. In Detroit by focusing her educational attention upon the parents of the 6 months old infant, she has materially increased the number of children protected. Now nearly 1 out of 2 of all infants born are being protected before they reach their first birthday.

The W. K. Kellogg Foundation has joined with the people who reside in 5 typically rural counties in southwestern Michigan in establishing full-time county health departments with adequately trained personnel. The health officers are physicians who have specialized in public health work, and the public health nurses, in addition to being registered nurses, are graduates in health education from recognized col-

leges. An unusually close relationship has been brought about in these communities between the medical profession, the dentist, the family health adviser, school teachers, ministers, newspaper men, social workers, and other groups and individuals who have a special interest in health education. Postgraduate courses for these rural physicians and dentists have been given in Chicago, Detroit, and elsewhere. Public health institutes have been held for school teachers, ministers, social workers, and health officers. The underlying motive has been to bring together in one compact unit the various groups who have a common interest, that is, the promotion of child health. At no time in the development of public health work has there been greater need of coördinating and cementing the common interest which, if not activated, remains dormant in the various educational and professional groups which because of training and experience may readily adapt themselves to health education.

We would not urge or recommend a standardization of procedure with the thought of its adoption for all parts of the United States. Rather is it fortunate that there are plenty of opportunities to experiment locally in counties and states, and from the experience of others we may choose and adopt methods in medical participation which appeal to our local conditions. It may be of interest, however, to outline a few of these local experiences. In Detroit, under the terms of a program adopted jointly by the Wayne County Medical Society and the Detroit Department of Health, some 1,100 physicians have agreed to carry on certain public health procedures in their own offices at specified hours. Each physician has indicated the days and hours when he will be available to provide diphtheria immunizations, further agreeing that at these special hours he will charge \$1 for each dose of the immunizing agent, and.

the health department has agreed to reimburse the physician at the rate of \$.50 for each dose in those instances where in his judgment the parent is unable to pay. There is, therefore, in effect an assurance plan, one which assures the child the type of preventive service to which he is entitled, and further assures that the service is available to all at a reasonable cost, irrespective of ability to pay.

This same general arrangement is in effect in Allegan, Eaton, Barry, and VanBuren Counties in Michigan where the W. K. Kellogg Foundation is coöperating and where under rural conditions it has been found practical to transfer the diphtheria prevention treatments from school clinics to the physician's office.

In Charleston, W. Va., the Health Officer, in coöperation with the Kanawha County Medical Society, confronted with an outbreak of diphtheria, determined to increase the percentage of children protected through a plan of medical participation. There are some 110 physicians in Charleston, of whom 88 participated. Conferences were first held with the city officials, the school officials, the health officer, and the members of the medical profession, at which the program was fully outlined and definite instructions given. After preparing the medical group, the education approach was directed toward the public and through the schools, by radio, through newspaper stories; and through other recognized health education channels public support and confidence were sought. There were no funds available with which to pay the physicians for service rendered to indigents. The local doctors felt, however, that the fundamental principle of having the work done in the physician's own office was so important that they would contribute their time to those children whose parents could not afford the modest fee of \$1. Four hours per week, 2 on

Thursday and 2 on Saturday, were designed by the 88 coöperating physicians as hours at which the service would be rendered. This work was carried forward so effectively that the percentage of preschool and school children protected against diphtheria was doubled within a period of a month. The number of protected children was increased to 50 per cent of the school group as well as 50 per cent of the preschool group, and diphtheria disappeared from Charleston.

Of special note is the fact that 52 per cent of the immunizations were paid for by the parents. Even had the local physicians not benefitted by this increase in revenue, there was no doubt in their minds that the program contained certain tangible by-products which eventually would be profitable not only to them but to the public and to the local health department. The physician who is alert to his responsibility and to the opportunity afforded by many new contacts established in his private practice, will endeavor to interest the child's parent in other health promotion services such as the periodic health examination, the recognition and removal of physical and mental handicaps, and the establishment of a friendly health consultation service between the physician and the family. This will unquestionably do much to overcome the existing influence that many cultists and pseudo-medical practitioners have established in the public mind.

There is nothing new or even novel in this program of medical participation. Many physicians and health officers have for years discussed the advantages of a plan whereby the professional man in private practice plays a more intimate part in the public health program. Recent experiences are but the application of recommendations which are almost universally acceptable. Instead of passively declaring that the physicians will not work with the health

department, the health officers have cultivated the medical profession and extended their facilities to encourage a coöperative plan.

While there has been a diminution in the need of clinics operated under health department auspices, it should be borne in mind that in no case has any service been discontinued until there has been created an effective substitute which will give service of as high a character or better service than that previously rendered. Specifically, the tuberculosis and venereal disease clinics in Detroit have not in any manner been curtailed, although an effort is being made in certain selected areas to transfer the services to the physician in private practice.

In one area during the past 2 years, all indigent cases of syphilis have been returned to the physician's office, the health department providing the necessary salvarsan and other drugs, carrying on the educational program and policing the patient in order to make sure that he remains under the care of his physician during the infectious stage of the disease.

In another area containing more than 300,000 people the coöperating physicians are examining in their own offices the known intimate contacts to reported cases of tuberculosis, are giving the tuberculin test to children of selected age groups and, in coöperation with the organized roentgenologists, are providing chest examinations for the positive reac-

tors. In this particular study no funds have been used to compensate physicians for service rendered to indigents unless the latter are on the public welfare rolls. In Albany the county medical society and health department were successful in securing an appropriation with which to establish a tuberculosis case finding program for all pupils entering the senior high schools, the physicians being paid by the city for service rendered to indigents.

The program places particular emphasis upon the prevention of disease. We all recognize that prevention is cheaper than cure. The program maintains that cordial direct relationship between physician and patient which has existed for so many centuries with satisfaction to each.

Can we not visualize a medical practice of the future wherein every qualified physician will maintain a disease prevention service and a health education center in his own office? where he will function as a disseminator of health knowledge and thus make available to the public maximum utilization of the products of our scientific laboratories and centers of medical research? Each coöperating physician will in fact become a deputized agent of the community health service. It is in this manner that we may look forward with confidence to continued progress in the elimination of needless sickness and premature death.

Serving the Public for Health^{*}

J. L. POMEROY, M.D., F.A.P.H.A.
County Health Officer, Los Angeles, Calif.

PUBLIC events during the worldwide depression in relation to health service for the people command serious attention from those of us engaged in administering official public health work throughout this continent. There are forces both within and without the ranks that may mean profound change in the future of our public health organization. The very structure of government itself is under fire. There is no doubt in my mind that the problem is fundamentally economic, but there are many conflicting interests and philosophies that exert a tremendous influence. Every health department has suffered the impact of budget cuts and of pressure from specialized interest all of which makes the question of the future of great moment.

Health service for the people includes not only preventive measures and sanitation in its broadest sense, but also, whether we administer the service or not, curative medicine. Community sanitation has to a large extent solved the problem of our major communicable diseases so prevalent a century ago, such as typhoid fever, yellow fever, plague, and similar infections. Diphtheria and smallpox may no longer be considered serious problems, since the means of control are well established. On the other hand, the respiratory in-

fections, nutritional disorders, dental infection and decay with its attendant focal infection, the increasing breakdown of the mental and nervous system, the growing mortality from cancer and heart disease, the terrific toll from accidents and the preventable diseases attendant on childbirth—these are a challenge to the public health departments of the United States.

In spite of tremendous effort put into the program of health education, we must admit that we have barely scratched the surface. The American people spend on an average of 125 million dollars¹ annually in support of the cultists and irregular practitioners of medicine, in addition to probably 360 million dollars for patent medicines and quackery. This situation is largely the result of the *laissez faire* policy or the so-called rugged individualism so frequently advanced as the solution of our many difficulties.

Much confusion exists in the minds of *some* members of the medical fraternity in regard to the newer phases of our public health program. The dictum from certain quarters that health officers must be concerned only with mass education, and that personal services to individuals must be omitted, shows a misunderstanding of modern public health procedure. Public health education itself has distinct and specific limitations. The most successful campaigns of health education, in my opinion, rest partly upon individual health service.

^{*} Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

IMPORTANCE OF INDIVIDUAL

With the discovery of the importance of carriers of disease, coupled with the revelation of specific methods of spread of infectious diseases, together with the progress made in early diagnosis, notably the X-ray in tuberculosis, the importance of the individual citizen in our campaign against disease and sickness has become paramount. We cannot X-ray a community or immunize a municipality. A single unknown carrier of an infectious disease may infect hundreds of other persons.²

In our campaign of case finding and early diagnosis of tuberculosis in the Los Angeles County schools, we have insisted in all positive tuberculin reactors that the parent be present to receive the interpretation of the test. During the past 3 years 16,000 children have been tested and in 85 per cent of the positive cases the mother has been present. This experience demonstrates that action is always dependent upon interest and upon motivation; without demonstration, public health education, in my opinion, is largely sterile. Many individuals demand demonstration rather than argumentation.

In California all county health officers must be graduates of a medical college of good standing and repute. The majority of the cities also require a doctor of medicine. The question of medical leadership certainly cannot be fairly raised under these conditions. Let us turn to the situation in regard to the practice of medicine in California. A recent survey shows that in Los Angeles County, besides 3,918 M.D.'s, there were 4,218 persons practising medicine who belonged to the cultists. These persons include 1,440 chiropractors, 927 osteopaths, 550 optometrists, and 101 midwives and drugless healers. Also, there are 1,200 known Christian Science practitioners with probably as many more unknown who, to all intents and purposes, are

engaging in the practice of medicine. Placing the average income of each of the 4,218 persons at \$2,500 a year, over 10 million dollars annually are diverted which should go to the regular medical profession. Probably almost as much money is spent in nostrums and patent medicines, the amount certainly reaching into millions of dollars. If means could be found to divert the money spent in nostrums, quackery, and cultism to the medical profession, I estimate that it would increase the annual income to every doctor in Los Angeles County somewhere between \$3,000 and \$5,000.

PUBLIC HEALTH SERVICE NOT LIMITED
TO PAUPERS

We approach the problem of the medical profession in relation to health departments with a sense of profound appreciation and generous gratitude for the service rendered by the physician. The services of well trained medical men are fundamental in the cause of community health. Their rewards are notoriously low compared to the costs of training and service to the public. We are inclined to question, however, the present tendency to curtail the so-called personal services of health departments and parcel out these functions through a process of financial subsidy. We propose to show that the difficulty cannot be met in this manner; that the cost is prohibitive; and that the risk to the health department from reduced public support is very great indeed.

Let me speak first of the idea so generally prevalent among medical men that the personal services of the health department should be limited to the pauper class. In this respect I wish to quote from the address of former President of the Association, Louis I. Dublin:

As in the field of medicine, public health work makes no distinction between rich and

poor, between high and low. The prevention, like the cure of disease, knows no level. The method and spirit of this movement maintains the finest of democratic traditions and holds out the largest promise for a glorious future. It is this phase of health service that should give purpose and direction to our professional work.³

May I also state that President Hoover in his White House Conference address likened the functions of preventive services in health departments to those of education. In fact, in reviewing the history of the public schools in America, I find almost the same arguments used today against the free preventive clinic in health departments as were used by the opponents many years ago during the struggle for our present public school system in America. Certainly if education, as practically everyone admits, is the very foundation of democracy, then what shall it profit a child to secure an education, if he die of preventable disease in so doing.

SURVEY OF OPINION

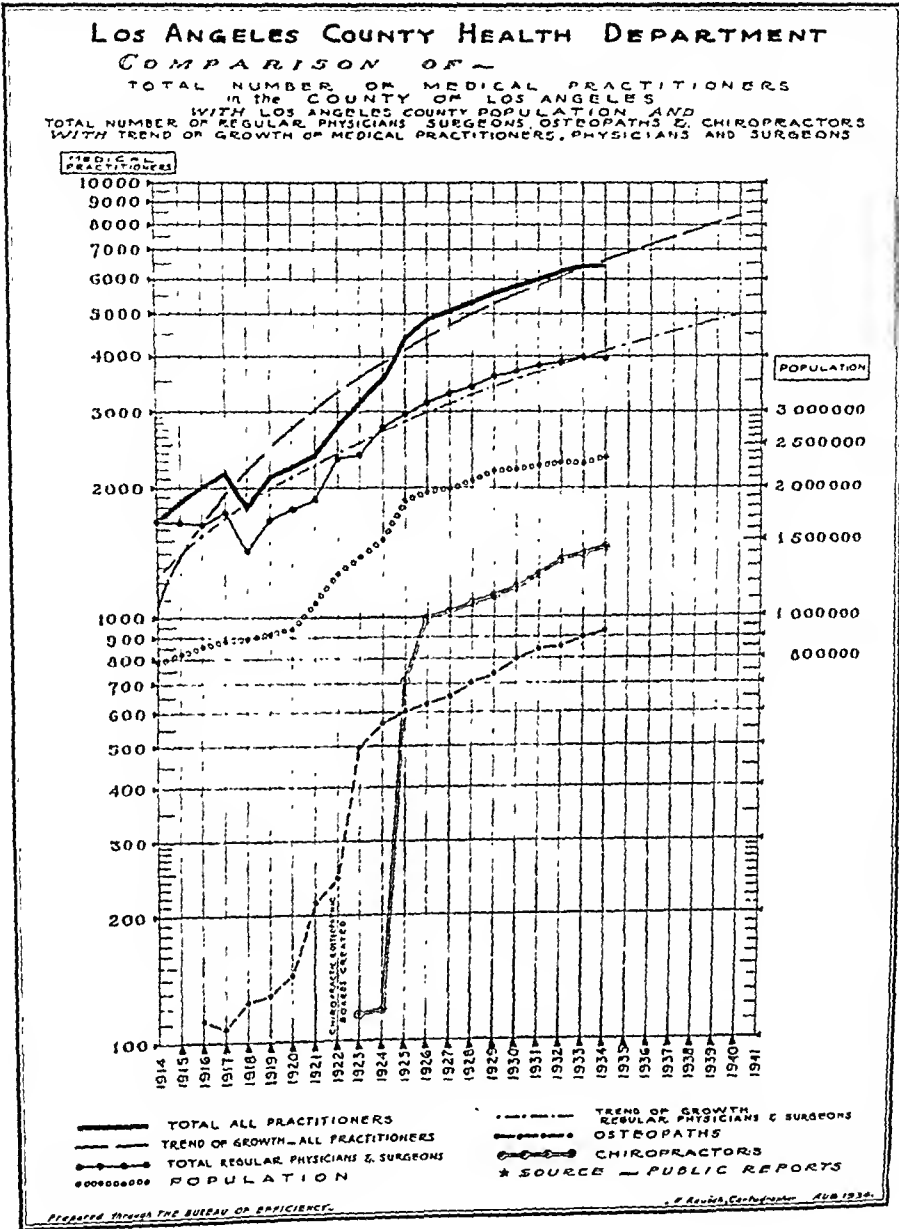
The writer presented these problems to some 30 leading health authorities throughout the United States during the last year, and is happy to say that the majority of the opinion was that the health department is *not* concerned with the pauper alone, but by virtue of its legal powers it is the *duty* of the department to serve the entire people.⁴ It was generally conceded that the economic problem of the medical profession is a phase of the general economic difficulties of our entire social structure, coupled with the need for group purchase of medical care, and the elimination of unfair competition from cults. The conclusion was obvious that the parceling out of the so-called personal health functions such as immunization by the payment of fees to private physicians would not solve the economic problem of the physician but might result in further curtailment of health budgets by the people.

Some \$3,000 raised by individual contributions from Health Department employees was expended in a 6 weeks campaign in the district of Belvedere on a diphtheria immunization program, in which all patients were routed to the private doctor's office.⁵ The doctor collected whatever he could but the Health Department furnished the toxoid. About 500 immunizations were secured and it was discovered that less than half of the population had a regular M.D. for a doctor. A considerable number of citizens criticised the health department for not doing the work. When the program was opened up on a free immunization performed by the health department, 3,000 were done in less than 2 months, at an expense of \$.41 per child. In view of the most insistent demands of economy in public government, we are scarcely justified in paying \$2.50 to \$6.00 to secure an immunization of a child when this service can be rendered by the department for less than \$.50.

It is the duty of the health officer to take such measures as are necessary in the State of California to prevent the spread of communicable disease. In view of the very evident obstacles in this method of medical participation, should any health officer endanger his entire program in pursuing a course which is apt to be opposed by the people?

UNOCCUPIED TERRITORY

The situation of the medical profession is also very largely a question of unoccupied territory. We grant that if the medical profession practised in all degrees the procedure of modern health departments in its well baby conferences, in immunization, in early diagnosis of tuberculosis, etc., there would be little need, indeed, for much of the activity of the health departments. The truth lies, however, in the fact that during *good* times few physicians, except



specialists, make a routine procedure of these methods. Many examinations held by the Civil Service Department of Los Angeles County during good times for positions paying around \$3,000 a year, found few candidates among our medical confrères. Since 1929, however, the health department has had frequent demands that it cease entirely its clinical services and at the same time that it expend thousands of dollars in employment of private physicians. Is there any reason to hope that these phy-

sicians who now clamor for public health work will retain their interest when good times return? Shall we disrupt an organization which has taken years to build only to have the task of reconstructing it in a short time?

GROWTH OF CULTISTS

What is the reason of the growth throughout the United States of the cults? It is a curious fact that, coupled with the curtailment of the opportunities for medical training begun some 20

years ago by our regular medical schools, there has been a tremendous and far-reaching increase of the cults. Thousands of young men denied the opportunity to study regular medicine have been lured both by the lower costs of chiropractic and similar training and also by the fact that through advertising methods an effective public demand for these services could be created. The growth of religious healing was undoubtedly in part due to the failure of the medical profession to recognize the needs and the opportunities in the field of mental healing. The psychiatrists have pointed this out many times. The growth of osteopathy and chiropractic is undoubtedly partly due to the neglect of the medical profession to use physiotherapy and similar methods in treating their patients. Here again we have the problem very largely of unoccupied territory.

It has been recently proposed as an aid to the solution of the economic difficulties of the physician that the number of graduates from our medical schools be restricted, and hence the number of licensees would automatically be cut down.⁶ It has been stated that there has been an annual excess of over 1,500 practitioners each year in the United States over and above losses through deaths. If Los Angeles County with a population of approximately 2,300,000 can support not only 3,918 practitioners of medicine but also 4,218 cultists, does this show that there are too many doctors? Will the cutting down of the number of regular M.D.'s not be accompanied by a corresponding increase in the cultists? In my opinion, the truth of the matter lies in the fact that we do not have too many doctors but an unequal distribution throughout the United States of physicians and medical facilities in general. Means must be found through proper basic science laws to curtail the growing grasping inroads of the cults. We must

look to these factors primarily as one of the important elements in the economic difficulties of the physician. Certainly the answer is not to be found in curtailment of the program of the health department.

THE HEALTH CENTER

The newer aspects of the technic of public health administration brought about the development of the health center. There is no doubt that the hospital has been of enormous benefit not only to the patient who receives treatment therein but as a remarkable visual education to the public of scientific medicine at work. The public school system advanced tremendously through the abandonment of the ungraded little red school house of the past and the adoption of the union or consolidated school system with specialized teachers and adequate equipment. What the hospital is to the medical profession and what the school building is to the teacher, the health center is to the public health officer. Until the conception of the local health center, many neighborhoods in counties and cities had no concrete object lesson, to fix in their minds the meaning of public health work, and had no personal contact except through a quarantine sign or an abatement notice with the health department.

Furthermore, the recent knowledge of the direct bearing upon health and disease of social medicine relating to the personal habits, emotional make-up, occupational adjustment, housing conditions, nutrition and food habits, and a host of other related influences, has meant a readjustment of our program. The idea of treating the family as a unit in the application of modern preventive sciences, both social and medical, rests upon a firm foundation. The recent knowledge of nutrition, the necessity of proper foods in the prevention of dental decay and dental infection brought into

the picture both dentists and trained nutritionists. The discovery that the X-ray was the most important single instrument in the early diagnosis of tuberculosis and an absolute necessity in childhood tuberculosis added to our armamentarium. The increasing use of the laboratory and the importance of the time factor in the diagnosis of infectious disease both from the standpoint of treatment and epidemiology meant bringing the laboratory closer to the people and to the doctor.

In our newer problems of public health the question of economics has become uppermost in our minds. It was therefore a natural step that there be brought together in the same building the health officer with his newer equipment, the social worker, and the medical practitioner. Such a program reduces overlapping of functions and waste of public funds, and enables us to serve a family with all of the necessary forces to effect a cure, to prevent the spread of disease, and to promote the health and longevity of the people. Furthermore, it seems necessary to take steps to get down in under the causes of indigency, especially medical indigency, and to study the means and measures that may be taken toward prevention.

During the past 20 years, in justification of our program in Los Angeles County, we may state that the County Health Department has returned to the people a dividend of 600 per cent on the money expended. Infant mortality has been reduced from 92.8 per 1,000 births in 1916, to 38 in 1933; the infant mortality among the white races in my territory is now 34. The death rate from diphtheria has been reduced from 16 per 100,000 population to less than 1. Typhoid fever, previously an extremely common disease, now shows a death rate of only 0.38 per 100,000 population. Tuberculosis has been reduced to 75 deaths per 100,000 population annually. Whereas previously

there was frequent interference with business activities, and closure of the schools during each winter was common, now such radical action is no longer necessary.

GOVERNMENTAL TRENDS

We come now to certain specific trends outside health departments and allied circles. Officially, the health department, being an organic part of government, is directly affected by political trends. At the present time approximately 17 per cent of the population is being supported and, to a large extent, provided with its medical needs by government. President Roosevelt has further announced a program of social insurance to be presented at the next Congress. California has taken the lead in appointing a Senate Committee to survey officially the high cost of illness and if in the judgment of this committee there is need for legislation directed toward aiding in the solution of this problem, the committee was instructed to present a Health Service Insurance Act to the coming session of the Legislature.

Senator Edward H. Tickle of this committee, in a public statement,⁷ says:

The Committee is aware of the violent controversies that attended the establishment and administration of this plan in other countries. The whole history of sickness insurance leads one inevitably to conclude that as, if, and when it is adopted, it *will* be adopted in response to public need and interest and over the opposition of special groups with private interests. I think we must agree that the interests of the public are paramount.

The California Medical Association has appointed a director and made available a sum of money to secure facts regarding the problem of health or sickness insurance or other provisions to meet this situation. Michigan has made a notable survey and adopted in principle a plan called Mutual Health Service,⁸ which is a plan to provide through the agency of a non-profit or-

ganization, health services at agreed costs to employed persons and their families whose annual income does not exceed \$1,500. This plan is deserving of encouragement by health officials throughout the United States. It provides for both curative and preventive care, and it is suggested that both the state and local health officers be made members of various committees when it is adopted. Under such a plan the health officer would be made responsible mainly for an educational program, both of the public and the medical profession. Regardless of the ultimate working out of such a plan, the aggressive leadership of the Medical Society of the State of Michigan is worthy of our admiration.

The health officer has been concerned vitally in meeting the continual reduction in budgets made largely in order to build up appropriations for local welfare departments. These departments have likewise encroached on the field of public health in taking over by reason of large appropriations many functions belonging to health departments. There is a strong trend toward consolidation of overlapping health functions in the creation of larger areas. It is proposed in California to consolidate the 58 counties into 14 large regions. *Shall the health department become merely a regulatory organization for law enforcement? or shall it play a major part in these newer programs?* Many health officers believe that the public health department is the logical authority to direct and consolidate the newer advances in meeting the economic problem of the masses in the care of the sick.⁹ Such a program, combining preventive and curative work, surely answers the critics of the European systems of health insurance.

By training, experience, and knowledge of the basic facts, I believe that the public health department should be recognized by the authorities and given

a major function in the new program of socialized medicine for those persons in the under-privileged class. I believe, further, to meet our present situation, that the American Public Health Association should make an effort with the proper authorities at Washington to see that grants of money now being given solely for relief purposes to states and counties be also given to health departments to meet our general curtailment in budgets. Most of the money stricken from health department budgets goes to local welfare organizations. The health needs of the unemployed and the indigent are just as important and in many instances more important than the relief problem. I therefore propose that the Federal Emergency Relief Agency be requested that in any city or county where the budget of the health department has fallen below a minimum of \$1 per capita a grant in aid be given in any instance where sums of money are allocated for relief purposes.

THE PRIVATE CITIZEN

In all of the discussions we hear very little indeed concerning the rights of man himself. The Children's Charter visualized to us those fundamental rights for the mother and child, but the child cannot be segregated from his family or his community. Unfortunately, nothing definite exists in the Constitution of the United States concerning the individual's right to health. Health must be interpreted as a part of the general rights of man. Neither is there anything specific in state constitutions except in so far as they create opportunities for health. Unfortunately, too, there is a strong tendency today to limit the health rights of individuals to those who can qualify as paupers. Demands are being made even to limit public health service to paupers. To further cloud the issue, no two agree as to who is an indigent person. We should protest against certain tendencies of today,

on economic grounds as well as on the principle of human rights, which permit an individual to exhaust his resources and likewise reach an advanced stage of his disease before the government may help him. In such diseases as tuberculosis, cancer, syphilis, and many others, not only is the cost to the government then far greater, but so far as the patient is concerned, much too late.

SUMMARY

1. The problem of rendering an adequate health service in a broad way to our American people is affected by the same difficulties which brought distress to industry—namely, overproduction, mal-distribution and ineffective demand. It is significant that the same amount of money expended today by individuals, to a large extent wastefully, would through a system of health insurance provide an adequate system of medical care. Such a system is particularly needed by those earning \$1,500 annually or less.

2. The situation cannot be materially improved by curtailment of production of regular doctors, since records show that cultism rapidly fills the place of the vanishing general practitioner. Distribution remains untouched, and effective demand must be increased through an enlarged program of health education. Universal basic science laws are needed to control cultism.

3. Health education must include at present both mass and personal instruction. In competition with cultism and quackery, demonstration and individual services are necessary to win many people back to scientific medicine.

4. The services of the health officer are not circumscribed by social status, or limited to the pauper class. While the health officer should encourage all persons able to pay to secure service from the private physician, diagnosis and preventive services in the control of communicable disease must be free to all citizens regardless of social status.

5. The health officer must discharge his duties in the most efficient and economical method possible. So long as such simple functions as immunizations, diagnosis of tuberculosis, and child hygiene instruction can be performed by health departments at one-tenth the cost of such work privately done, the department is obligated to perform the functions itself. Direct methods of solicitation of persons for private practice by public employees

is fraught with grave danger of diminished public support. No other governmental function is performed in such a manner.

6. Consolidation of health functions of individual overlapping health units should be encouraged, creating larger regional areas, and integrating health functions now often the source of much public criticism of waste of money.

7. The health center as an instrument to bring about effective coördination of social, medical, and preventive community activity has proved itself necessary in developing a new technic in disease prevention and health promotion.

8. Basic health department functions as defined by the American Public Health Association must be preserved and financially rehabilitated. Federal funds from the F.E.R.A. or other agencies should be made available through the U. S. Public Health Service to subsidize weakened state and local health departments in stricken, impoverished areas. Subsidies might be based on \$1 per annum for each unemployed person in such areas, with the provision that local government, if possible, bring the total health budget up to the minimum of \$1 per year for total population.

9. President Roosevelt has announced a message on Social Insurance at the next Congress, and the New Deal promises much for the improvement of the public health. A new interest in social justice for the individual is in the air. Since the health department is an organic part of government we must prepare ourselves for possible change in administrative problems.

Not alone for reasons of social justice to the individual but for purely economic reasons, government has a stake in increasing appropriations for disease prevention. Huge sums of money, federal, state and local, are now annually expended in caring for persons who have reached helplessness through terminal conditions of disease, much of which is preventable.

The dictum of Hermann Biggs that public health is a purchasable commodity is as true today as when this statement was first made. Public health work returns huge dividends to our people; its stock has never been watered, nor its values inflated. Health service in its larger phase is a problem basically of economics, the solution of which requires earnest coöperation of both public and private interests.

Let us hope that together we may lift somewhat the burden of sickness and distress, disease and disability from the backs of the working men and women of America.

REFERENCES

1. Reed, Louis. *The Healing Cults, Abstr. No. 16.* Committee on the Costs of Medical Care.
2. Winslow, C.-E. A. Public Health at the Crossroads. *A.J.P.H.*, 16:1075-1085 (Nov.), 1926.
3. Dublin, Louis I. The Health of the People in a Year of Depression. *A.J.P.H.*, 22:1123-1135 (Nov.), 1932.
4. Pomeroy, J. L. *Viewpoints of Public Health Experts and Los Angeles County Medical Society.* Mimeograph report of various authorities, L. A. County Health Dept., Report—1934.
5. Pomeroy, J. L. Economic Problems in Public Health Practice. *West. Hosp. Rev.*, 20 (Nov.), 1932. Reprint.
6. Biering, Walter L. The Family Doctor and the Changing Order. *J.A.M.A.*, 102:1995-1998 (June 16), 1934.
7. Tickle, Senator Edward H. To Distribute the Risk. *West. Hosp. Rev.*, 22:5 (Aug.), 1934.
8. Michigan State Medical Society. Mutual Health Service. Supplement to *J. Michigan State Med. Soc.*, 23 (May), 1934.
9. Parrau, Thomas, Jr. Health Services of Tomorrow. *Am. Acad. Pol. and Soc. Sc. The Medical Profession and the Public*, 1934, pp. 75-87.

NOTE: Since September 3, 1934, when the above paper was read, considerable progress has been made. The National Recovery Act has passed, granting among other things federal funds for the U. S. Public Health Service and other governmental departments. In California, the House of Delegates of the California Medical Association in coöperation with the State Department of Public Health and the S.E.R.A. authorized an Economic Survey on the problem of medical care. This survey showed clearly the extent of inadequate medical care in the family group earning less than \$3,000 per year. It showed one-third of the doctors of medicine earning less than \$2,000 in 1933 (net); one-half earning less

than \$3,000 (net); and three-fourths less than \$5,000 (net). Approximately 20 per cent of the persons surveyed were in need of medical care, and only 40 per cent in need were obtaining aid.

As a result of this survey the House of Delegates of the California Medical Association adopted a resolution approving health insurance and recommending that legislation be proposed seeking to establish a health insurance system mandatory as to certain population groups and voluntary as to certain population groups, including the following principles: (1) that the patient shall have absolutely free choice of physician and hospital; (2) that the medical profession shall determine and decide all matters relating to professional standards; (3) that there shall be no provision for cash benefits; (4) that the patient shall receive adequate treatment and his physician shall receive adequate compensation; (5) that these principles shall be maintained with such modifications as may be from time to time recommended and approved by the profession.

The California Senate Ad Interim Committee on Health Insurance with the assistance of a committee representing the California Medical Association prepared and introduced Senate Bill #454 proposing voluntary health insurance for persons above a family income of \$3,000 a year, and a compulsory system of health service insurance on all persons where the family income is less than \$3,000 per year. While the bill is undergoing many modifications it is thought that it has a possible chance for passage at this legislature.

In Japan

JAPANESE villages without medical facilities are to have them provided through the munificence of Mitsubishi, a famous millionaire, who has given 6,000,000 yen (\$2,340,000) for social welfare work. About \$600,000 will go for village medical service. Over 3,500 villages are without doctors and 1,000 are in "urgent need," according to the Japan correspondent of the *Journal of the A.M.A.*

A clinic or office will be built in each village at a cost of about \$600 and by 1936, 1,000 doctors will be appointed to these remote villages. As a rule, there will be no medical fee in case of poor farmers and fishermen, but for well-to-do people there will be a small fee, which is expected to be paid chiefly by the annual relief fund or from special grants made by the emperor yearly.—*N. Y. Journal of Medicine.*

Fluorine Toxicosis

A Public Health Problem*

MARGARET CAMMACK SMITH, PH.D.

Nutrition Chemist, University of Arizona, Tucson, Ariz.

THE widespread occurrence of mottled enamel, a defect of the teeth which is caused by the action of fluorine present in many public and private water supplies, makes fluorine poisoning a public health problem.

We recognize at least 3 types of mottled enamel as may be seen in Plate I, the mild chalky white type, the more severe stained type, and the pitted, corroded type.

It is obvious that mottled teeth are very disfiguring and ugly, for the stain which commonly filters into the porous areas is usually rust colored. In addition, mottled teeth are defective in formation and calcification and are, therefore, structurally weak. The defect is irreparable and permanent. It has been estimated by the Tucson Dental Association that it would cost \$1,000 for dental care of the teeth of the average person with mottled enamel, up to adulthood, at which time the teeth must usually be replaced by false ones.

Fluorine is very common in nature, occurring in many rocks and soils, and ranks 20th in quantity in the earth's crust. It is natural, therefore, that fluorine should find its way into many water supplies, and when it is realized that drinking water containing as little as 1 p.p.m. of fluorine will cause mottled

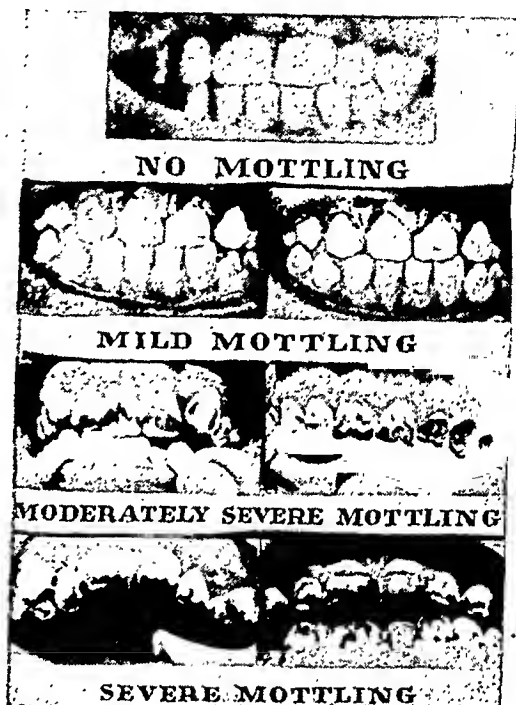


PLATE I—Typical cases of mottled enamel in human beings who drink water containing fluorine.

enamel, it is not surprising that there are sections in every country in the world and in 24 states of the United States* in which mottled enamel is reported and most of the native born inhabitants are afflicted. It is perhaps most prevalent in the arid states of the Southwest. Our survey¹ of Arizona

* Arizona	Kansas	Oregon
Arkansas	Louisiana	South Carolina
California	Minnesota	South Dakota
Colorado	Nevada	Tennessee
Florida	New Mexico	Texas
Idaho	North Carolina	Virginia
Illinois	North Dakota	Washington
Iowa	Oklahoma	

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.



PLATE II—A. Normal rat incisors. B. Mottled incisors of a rat which received sodium fluoride. Note loss of luster and pigment and corrosion of enamel.

made in 1931 has revealed more than 45 scattered communities in which mottled enamel is endemic. The fluorine content of the water supplies in these communities varied from 1 to 6 p.p.m. The only other extensive state survey which has been made is that of Colorado. Boisevain² reports the occurrence of mottled enamel in 25 communities in Colorado. In all probability, mottled enamel is equally as prevalent in other states, especially Texas and New Mexico.

Mottled enamel has been produced experimentally in albino rats, in guinea pigs, and in dogs (see Plates II and III)³ by the feeding of fluorides or the residue of water from a community which contains fluorides. A number of lines of evidence indicate that the fluorine passes into the blood stream and interferes with the calcification of the unerupted teeth of children. It does not act in the mouth upon the enamel of the erupted portion of the teeth. The teeth of children or adults who do not begin drinking water containing fluorine

until after their second sets of the teeth have erupted do not later show mottled enamel.

In humans, the enamel organ disappears as soon as the enamel of the permanent teeth is completely formed and calcified. The enamel does not regenerate itself and behaves, therefore, like dead tissue. For this reason the enamel of the teeth of adults is un-



PLATE III—Effect of fluorine feeding upon the permanent teeth of a dog. Note corrosion and chipping of the enamel.

affected by the drinking of water containing fluorine. It is almost possible to tell at what age a child moves into a community whose water supply contains fluorine, by the teeth which show mottled enamel. If the person has lived from birth in a community in which mottled enamel is endemic, all of the teeth will be mottled. If a child moves into such a community after the age of 12 to 13 years, only the wisdom teeth will be mottled, for they will all have erupted before he drinks the fluorine containing water. Again, a child who begins to drink fluorine containing water at the age of 5 to 6 years will have no mottled enamel on the 6 year molars, central incisors, and probably the laterals, but will have mottled cuspids, bicuspid, and second molars, for these teeth are in the process of formation at this age.

Experiments on rats whose incisor teeth are continually growing also have demonstrated that the feeding of fluorides does not mottle the erupted portion of the incisors, but it is only the new incisor growth which erupts 2 to 3 weeks after the beginning of the feeding of fluorine which shows the characteristic defect.

We have injected sodium fluoride subcutaneously, and again the evidence indicates that the injected fluorine goes to the site of enamel formation and interferes with the calcification of the enamel of the unerupted portion of the incisors. In rats with intermittent injections of fluorine, the results appear in about 3 weeks after the first injection (Plate IV). The lower incisors of the rat completely renew themselves every 30 days. Normal enamel areas alternate with the areas of defective calcification, the extent of which corresponds with the interval between the injections. The mottled appearance of human teeth may well be explained by an intermittent use of fluorine containing water, or a daily variation in the amount of the drinking water consumed.

Although it is true that the enamel of adult teeth is unaffected by fluorine, the dentine of adult teeth which does receive nutrients from the blood stream continually and whose composition is subject to change, may suffer. Histologic examination⁴ suggests that this may be the case. A microphotograph (Plate V) of the incisor of a rat which received 8 injections of sodium fluoride showed 8 stripes in the dentine which was



PLATE IV—Effect of intermittent injections of sodium fluoride. Different effects can be produced by varying the interval between the injections and the amount of fluoride injected.

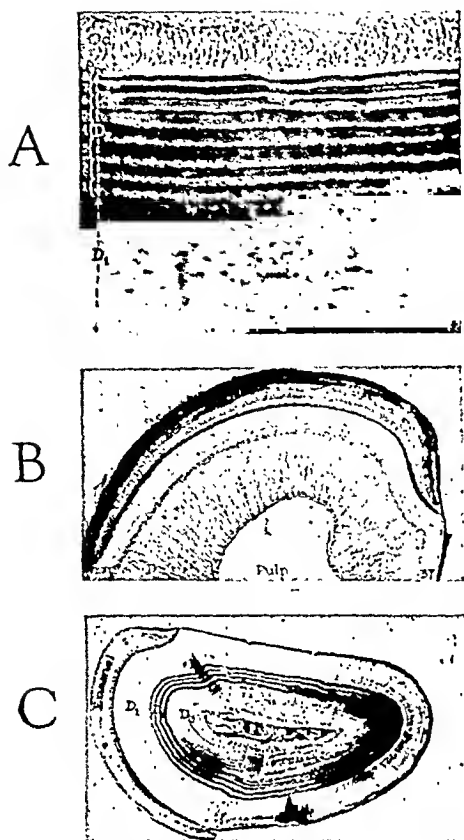


PLATE V—Microphotographs of incisors of rats receiving injections of sodium fluoride. A. Eight injections given on alternate days resulted in 8 decalcification stripes in the dentine. B and C. Transverse ground sections showing stratification in both the dentine and the enamel of the incisors of a rat which received 4 injections of sodium fluoride given at 48 hour intervals.

tine formed before and after the injections were begun was normal. Plate Vb shows a cross-section of the incisor of a rat which had received 4 injections of sodium fluoride. Stratification in both the enamel and dentine may be observed.

It may perhaps be concluded, therefore, that the dentine portion of the teeth of adults who drink fluorine containing water may be adversely affected, resulting in a general weakening of the tooth structure, although the change will not be externally visible.

The question naturally arises then as to the effect of fluorine upon bone. High fluorine feeding (0.1 per cent NaF in the ration) produced a short, square, and stocky appearance in the skeleton of the rat, with the enlarged, deformed bones and bowing of the legs typical of severe rickets. In addition, the bones of the fluorine fed animals, like the teeth, were chalky and fragile. A measurement of the storage in the body of the bone forming elements, calcium and phosphorus, as determined by measurement of the balance between the intake and the output showed that the young fluorine fed animals retained only slightly more than half as much of these elements as did the normal litter mate rats which served as controls (Table I).⁵ The fluorine increased the loss or elimination of calcium, and bone

TABLE I
CALCIUM AND PHOSPHORUS RETENTION OF GROWING RATS

Fluorine Fed	Per Cent Intake Retained		Daily Retention per Kilo Body Wt.	
	Ca	P	Gm. Ca	Gm. P
	Period I			
None	72.6	43.6	0.418	0.278
0.05%	62.7	36.2	0.322	0.203
0.1%	57.9	14.8	0.237	0.068
	Period II			
None	82.1	44.5	0.473	0.286
0.05%	69.8	40.1	0.361	0.231
0.1%	40.6	21.4	0.183	0.107

TABLE II

CALCIUM AND PHOSPHORUS BALANCE EXPERIMENTS WITH GIRLS

Subject	Age	Retention per Kilo Body Wt.		Per Cent Excretion in Urine	
		Mg. Ca per da.	Mg. P per da.	Calcium	Phosphorus
Mottled enamel	10	5.1	1.7	15.7	62.5
Control	10	3.7	1.0	5.5	55.1
Mottled enamel	13	1.4	3.5	12.6	73.3
Control	13	1.4	5.9	5.7	70.2

development was accordingly retarded. Addition of calcium to the diet, however, prevented this loss to a large extent but at the same time the teeth remain severely mottled.

Similar experiments performed on girls of 10 and 13 years who had mottled teeth, due to the fact that their drinking water contained fluorine, did not show a disturbance in their ability to metabolize either calcium or phosphorus (Table II). No signs of bone defects or other indications of defective mineral metabolism have been observed in children whose teeth are severely mottled. It may be concluded that although the drinking of water containing from 1 to 6 p.p.m. of fluorine will severely impair the teeth, the calcification of the bones is probably not upset to any great degree. The teeth are extremely sensitive to fluorine which seems to exert a more specific effect upon them.

Our work has also shown that the interference of fluorine with the calcification of the teeth cannot be prevented by increasing the calcium content of the diet or by a liberal intake of vitamin D in the form of cod liver oil or viosterol. Supplemental feeding of vitamin D concentrates to rats, dogs, and children over a period of years has in no case prevented the action of fluorine or made its effect upon the teeth less severe.

Mottled enamel is usually found only on the second or permanent set of teeth. We have examined thousands of chil-

dren and noted that the deciduous teeth were free from mottled enamel, whereas all the erupted permanent teeth were mottled. It is believed that the formation of the temporary teeth begins about the 3rd week of fetal life and they are largely calcified at the time of birth. The eruption is usually complete at the age of 2 to 2½ years. In explanation of this almost complete freedom of deciduous teeth from mottled enamel, McKay said "It must be remembered that the temporary teeth are formed largely before birth and are sheltered against outside influences, with a nutritive supply dialyzed through placental osmosis." It is true that thousands of cases have shown that even though mothers drink water containing sufficient fluorine to cause severe mottled enamel (as much as 6 p.p.m.), the deciduous teeth of their children are free from this defect. If the children drink this water from birth however all of their permanent teeth are severely mottled. It would appear that a toxic concentration of fluorine does not find its way through the placental membrane or into the milk supply of the mother.

In support of this, our experiments with rats have shown that even though we feed a high concentration of fluorine (0.05 per cent NaF in the diet) to pregnant females, their offspring have normal teeth at the time of weaning which later become mottled when the young rats have access to the food of the mother animals. Phillips⁶ has

shown that feeding a large amount of a mineral supplement to lactating cows containing enough fluorine to produce a toxic effect upon the cows themselves, did not appreciably increase the fluorine content of their milk. From this evidence it seemed likely that the milk of cows raised in regions in which the water supply contained fluorine could be considered safe from the fluorine standpoint and that pregnant and nursing mothers could drink the fluorine containing water without endangering the temporary teeth of their children.

However, our more recent findings make this conclusion somewhat untenable. A district has been recently visited in which the native born children have mottled enamel of the severest type upon their temporary teeth. This extreme condition was not suggestive of mottled enamel at first glance, for the characteristic chalky whiteness of the enamel could not be observed as the teeth were almost devoid of enamel and ground down almost to the gum line. Analysis of the private water supplies in this section of the state revealed fluorine contents varying from 12 to 18 p.p.m., the highest fluorine concentration yet reported for potable water supplies. It would appear therefore that deciduous teeth are *not* exempt from the toxic action of fluorine and that they will become mottled if the water supply contains an extremely high concentration of fluorine.

Fortunately, the occurrence of mottled enamel is sectional. Colorado Springs is perhaps the largest city where the water supply contains fluorides. There is an agricultural practice which, unless controlled, will make mottled enamel more prevalent and no longer sectional in distribution. I refer to the growing use of fluorine compounds as insecticide sprays against agricultural pests. Fluorine compounds are being more and more extensively used as a substitute for arsenicals whose

toxic action is known and feared. Cryolite, barium silicofluoride and sodium silicofluoride are among the compounds now rather commonly used for spraying apples in the Northwest, and vegetables such as cabbage, cauliflower, broccoli, celery, etc., especially in Florida and California. The fact that these compounds of fluorine are relatively insoluble has raised the question as to their toxicity. Our study⁷ on rats, of the comparative toxicity of fluorine compounds has shown that from the standpoint of the initial damaging effect upon the teeth all are equally poisonous. One mg. of fluorine per kilo of body weight per day, or a concentration of 14 p.p.m. of fluorine in the ration of rats, regardless of the source of the fluorine, will prevent the normal development of the incisor teeth.

Fluorine is even more toxic to the teeth of human beings than to rat incisors which grow at a more rapid rate. A concentration of only 1 p.p.m. in water supply will produce mottled enamel in humans. If we assume an average water intake of from 4 to 8 glasses a day, the average fluorine intake per day from this source will be from 1 to 2 mg. per person.

Analyses of the fluorine residues on food material have been made by the U. S. Department of Agriculture 3 months after the foods were sprayed with various commercial fluorine sprays. Apples sprayed with barium silicofluoride showed an average fluorine content of 5.6 p.p.m. before washing. One of these large apples would therefore provide as much fluorine as 4 glasses of water containing 1 p.p.m. of fluorine. The fluorine residue on cabbage varied from 1.6 to 11 p.p.m., on celery from 9.9 to 28, on cauliflower, from 1 to 3.

Experiments upon the removal of spray residue by washing have been made by Smith and his coworkers of the U. S. Department of Agriculture. They report that fluorine residue removal

amounts to only 85 to 90 per cent by the best washing process available so that "it was impossible satisfactorily to clean fruit originally carrying 0.1 gr. or more of fluorine per lb." They also state that the fluorine residue on fruits sprayed with cryolite or barium silicofluoride plus fish oil was practically impossible to remove to meet the fluorine tolerance set by the U. S. Department of Agriculture even when the most efficient methods were used. It seems logical to suppose also that it would be even more difficult to remove fluorine from the leafy vegetables than from apples.

With the human tolerance level for fluorine so low, it seems a dangerous

practice to use the compounds of fluorine for spraying purposes. The ugliness of mottled teeth alone causes untold misery to the afflicted persons.

REFERENCES

1. Smith, H. V., and Smith, Margaret Cammack. *Arizona Exper. Sta. Tech. Bull.*, 43, 1932.
2. Boissevain, C. H. *Colorado Med.*, Apr., 1933.
3. Smith, Margaret Cammack, and Lantz, E. L. *Arizona Exper. Sta. Tech. Bull.*, 52, 1934.
4. Schour, Isaac, and Smith, Margaret Cammack. *Arizona Exper. Sta. Tech. Bull.*, 52, 1934.
5. Lantz, E. L., and Smith, Margaret Cammack. *Am. J. Physiol.*, 1934.
6. Phillips, P. H., Hart, E. K., and Bohstedt, C. *J. Biol. Chem.*, 1934, pp. 105-123.
7. Smith, Margaret Cammack, and Leverton, Ruth M. *J. Indust. & Eng. Chem.*, 26:791, 1934.
8. Newcomer, E. J., and Carter, R. H. *U. S. Dept. of Agri. Tech. Bull.*, 373, 1933.
9. Smith, E., Ryall, A. L., Gross, C. R., Carter, R. H., Murray, C. W., and Fuhey, J. E. *Proc. 29th Ann. Meeting, Washington State Horticultural Assn.*

Cure for Stubborn Wounds

FROM a clue provided by an insect, entomologists of the U. S. Department of Agriculture have discovered a new way to heal stubborn wounds quickly, painlessly, and cheaply. The new treatment is the application of a solution of allantoin, a bland, odorless, harmless, and easily obtained product found in both insects and plants.

The insect that gave the clue to this discovery is one of the flies—in the maggot stage—that gained fame as a medical aid on World War battlefields, where an Army doctor found that wounds infested with maggots healed better and faster than wounds without

them. Since then surgeons all over the world have used maggots in treating deep infections difficult to cure by ordinary surgery.

Dr. William Robinson, of the Bureau of Entomology and Plant Quarantine, now finds that allantoin, which is given off by the maggots as they work their way through a wound, is responsible for part of this power. Dr. C. J. Macalister, who used it successfully 23 years ago for ulcers, reported that European peasants had long applied the roots of comfrey, which contain allantoin, to sores.—Press Release, U. S. Dept. of Agriculture, Apr. 23, 1935.

American Standards for Exhaust Systems

CYRIL AINSWORTH

Assistant Secretary, American Standards Association, New York, N. Y.

BECAUSE the Safety Code for Exhaust Systems is now in the process of active development, and in view of the participation of the American Public Health Association in this project through its Industrial Hygiene Section, it was felt desirable by your officers that the plans for carrying on this activity be presented to you for your consideration.

Before going further into this specific question it might be well to present a brief picture of the American Standards Association. Some of you have participated in the development of standards under A.S.A. procedure and are therefore somewhat familiar with its methods of work. With others this is not the case.

The A.S.A. was organized in 1918 by 5 of the major technical societies (mechanical, electrical, civil, and mining engineers and the Society for Testing Materials) for the purpose of properly coördinating the engineering and industrial standardization work which they had been carrying on individually. The organization was then known as the American Engineering Standards Committee. The change to an Association was made in 1928.

The objects of the organization are:

To serve as a clearing house for standardization work in the United States

To further the standardization movement as a means of advancing national economy

To serve as a bureau of information on standardization matters

To act as the authoritative American channel in international coöperation in standardization work.

A large variety of standards is handled including:

1. Nomenclature
Definitions of technical terms used in specifications and contracts and in other technical work
Abbreviations
Symbols for quantities used in equations and formulae
Graphical symbols
2. Uniformity in dimensions necessary to secure fits; and to provide for the interchangeability of parts and supplies, and the interworking of apparatus
3. Quality specifications for materials and equipment, both for producer goods and for consumer goods
4. Methods of test
5. Ratings of machinery and apparatus which establish test limits under specified conditions as a basis of purchase specifications, or which establish requirements as to performance, durability, safety, etc., under operation
6. Provisions for safety
7. Rules for the operation of apparatus and machinery in industrial establishments
8. Concentration upon the optimum number of types, sizes, and grades of manufactured products

The work is carried out by simple but systematic methods of coöperation, through which all groups interested in any particular project participate: (1) in deciding whether the work shall be undertaken at all; (2) in formulating the standard; and (3) in its ultimate approval as an "American Standard." The arrangement is flexible, and alternative methods have been developed, as the result of experience, all based upon

the same principle, *viz.*, the assent, affirmatively expressed, of the groups having a substantial concern with the scope and provisions of the standard.

The usual method is that of a joint technical committee, made up of representatives of the various interested groups. These joint committees form effective cross-sections of the interested groups, and are called sectional committees. This is the method being followed in the development of the safety code for exhaust systems. In large projects such as this the detailed work is generally drafted by sub-committees.

To date, 266 standards have been approved and 173 others are under way. In this, more than 600 national organizations are officially participating. Approximately 3,000 experts are serving on the various committees.

A very important group of the standards approved by the A.S.A. is that group comprising the 40-odd safety codes. This phase of A.S.A. work was initiated in 1919 following two conferences held in Washington, D. C., under the auspices of the U. S. Department of Labor and the National Bureau of Standards, called to discuss ways and means of obtaining relief from the situation caused by the multitudinous number of conflicting rules, regulations, and safe practice recommendations, which had been developed and promulgated by regulatory bodies, insurance groups, trade associations, and individual companies. As a result of the discussions the A.S.A. was requested to extend its scope of activities to include the development of safety codes on a national basis.

The American Standards Association accepted this mandate and changed its form of organization to include a safety group composed of the National Safety Council, both stock and mutual casualty insurance companies, the U. S. Department of Labor and the National Bureau of Standards. A National ad-

visory committee now known as the Safety Code Correlating Committee was organized to advise the A.S.A. in regard to the nature of the projects that should be undertaken, the appointment of technical committees, the scope of the work of individual projects, and to determine the degree of consensus that has been arrived at on the acceptability of codes submitted for approval as "American Standards." In addition to the organizations just mentioned, several industrial groups—fire protection organizations, the International Association of Industrial Accident Boards and Commissions, and the Association of Governmental Labor Officials—are represented on this national advisory committee.

The program developed by this committee has grown in the number of codes completed and under way, and in the extent of the use of A.S.A. Safety Codes by regulatory bodies, insurance groups, individual trade organizations and companies. Many departments of labor and industrial accident commissions have either adopted many of the codes verbatim or used them as the basis of state regulations. The National Compensation Rating Schedule of the insurance companies has been brought into harmony with A.S.A. codes. In states where the schedule is no longer effective, American Standard Safety Codes are used as the basis of insurance recommendations for the removal of accident hazards in industrial establishments.

A number of important safety codes are under development at the present time. Some of these were initiated as part of the original program outlined by the Safety Code Correlating Committee.

The code for exhaust systems is such a project, and although a number of years have elapsed without much progress being made, it is gratifying to report that the committee is now quite active.

When the code for exhaust systems was initiated some years ago it was intended that its scope would cover the construction and operation of such systems from an engineering point of view. The delay in developing a code around this scope came chiefly through the conflicts of opinion existing in the group comprising manufacturers of exhaust equipment. Some believed that trade secrets were involved. Others differed as to the engineering principles involved. All of these differences resulted in years of delay. Finally the organization which was then sponsor for the project, the American Society of Heating and Ventilating Engineers, asked to be relieved of its duties as administrative leader for the work in order to be able to devote all its attention to the ventilation code. The request was granted and the International Association of Industrial Accident Boards and Commissions took over the administrative responsibilities for the work.

The new sponsor immediately proceeded to reorganize the sectional committee. New organizations were added, and representation of other organizations were changed. Since this reorganization has taken place two meetings of the committee have been held and a new scope and a plan of operation have been adopted.

The sectional committee has decided to approach the very difficult task with which it is faced by developing, step by step, a set of separate standard specifications for exhaust hood designs and air velocities for each distinct process or industry. Thus each group of specifications will constitute a separate standard applicable only to the specified process or industry. Initial projects upon which sub-committees are about to be appointed are as follows:

1. Abrasive Cleaning
2. Chromium Plating
3. Granite Cutting
4. Rock Drilling
5. Spray Coating

While it is contemplated that additional exhaust specifications will be developed for additional processes as opportunity offers, the above group was chosen because there appear to be already available sufficient data from field studies and laboratory research upon which reasonable and adequate standards can be based.

During the past several years there has developed in many industries throughout the country a very exceptional and severe claim situation based on the alleged exposure of industrial workers to a considerable variety of materials that contaminate the workroom air—the claims being based on so-called “occupational diseases” resulting from the inhalation of air containing allegedly injurious substances in dangerous concentrations. While the accurate evaluation of these occupational disease claims is a medical one beyond the scope of A.S.A. undertakings, the problem of minimizing the exposures in question is largely an engineering problem of exhaust equipment applied to the process that causes contamination of the workroom air, a problem quite amenable to standardization. No uniformity of practice throughout industry has developed as yet to meet the situation.

Of considerable importance in this connection is the wide variation in existing State Labor Department Regulations that have been promulgated to correct the hazards here in question. In many instances, these regulations are too general in phraseology to prove of assistance to industry in applying specific corrective measures. In other instances the standards of performance are set impracticably and unnecessarily high. In general, it is fair to say that these local regulations have not been worked out with sufficient technical skill to prove of practical value to plant managements in their efforts to solve their occupational disease problems. This is quite understandable as very few

if any of the regulatory bodies have had sufficient funds, particularly during the past few years, to enable them to carry on the research and field work that is so essential in securing adequate information. One might also raise the question as to whether or not the best results can be obtained if a considerable number of independent research projects on the same subject are undertaken. It would seem much better if such activities could be correlated through one central clearing house and in connection with a well thought out and well coördinated plan of standards development.

In addition, and quite unfortunately, the mere technicalities of state regulations are at times being utilized in law suits to establish the legal status of negligence more or less regardless of any medical proof that injury has actually been received by the claimant in the course of his employment.

It is the hope of the Exhaust Code Sectional Committee that national standards for exhaust of numerous industrial processes can be developed with such weight of technical authority back of them that these "American Standards" will either be used verbatim by state regulatory bodies, or that the technical principles established in the

standards will be used as the basis of state regulations. The committee hopes to appoint an advisory committee of toxicological, pathological, and engineering experts to assist in the determination of threshold limits for the toxic dusts, gases, and fumes, that are to be removed through the use of exhaust systems. This, it is hoped, will tend to coördinate the existing points of view of experts, and also give the standards the authoritativeness which will automatically obtain the acceptance which the committee anticipates.

Already the financial losses incurred by industries throughout the country from occupational disease claims have mounted into millions of dollars, and there appears to be an increasing demand from all persons interested that adequate but practically reasonable standards be developed for these hazards, especially along the lines of exhaust equipment which is the logical solution of the great majority of industrial hazards of this type. The Exhaust Code Committee has an extensive problem before it that involves a considerable volume of detail and it welcomes the full coöperation and participation of the American Public Health Association in this work.

The Future of the Program for Tuberculosis Control*

KENDALL EMERSON, M.D., F.A.P.H.A. (*Life Member*)

Director, National Tuberculosis Association, New York, N. Y.

THE decline of the tuberculosis death rate in this country to one-third its 1900 level is not an accident. On the contrary it is an outstanding example of man's capacity in certain measure to carve out his own terrestrial destiny. To no one cause can be attributed even major credit for this triumph. It has not resulted from the discovery of any specific cure. The achievement was possible only by combining all the forces of medicine, public health, social and industrial welfare in a common effort to control this greatest menace to race survival.

Among the factors involved in the concerted attack on this disease the National Tuberculosis Association has at least played a persistent rôle. In the past ardor of youth it may have claimed more than its share of accomplishment. In its maturity it is operating in closer harmony with its official and unofficial colleagues. In the future it seeks an opportunity to supplement even more effectively the work of those coöperating health and social welfare agencies through whose joint activities the organized attack on tuberculosis looks forward to ultimate victory.

Already there is a fair measure of agreement as to the trends that a future program must take. This can be shown

without too great detail by observing certain historical characteristics revealed by an examination of the statistical record of the declining mortality rate.

In 1932 Dr. Hofbauer published a report¹ discussing a chart (Figure I) which he had compiled showing the death rate from tuberculosis in differing cultural groups in the city of Hamburg during a period of 30 years. At the beginning of this period it could be shown that the industrial and poorer classes exhibited a death rate several times that prevailing among the more intelligent and more fortunate economic groups of the community. This fact is consonant with our general knowledge of the epidemiology of tuberculosis.

The significant interest in Dr. Hofbauer's investigation lies in the extension of the two mortality graphs. He found that as organized efforts to improve public health proceeded the gap between the curves steadily lessened. At present the lines have drawn practically together and the contrast between classes tends to disappear. His conclusion is that the rough work of tuberculosis control is nearing accomplishment. The difference in death rate due to social differences, industrial causes and underprivilege will not be so evident in the future. We cannot hope for further marked lowering of mortality through the alleviation of environmental causes alone. From a situation where almost any improvement in sanitation and personal hygiene would re-

* Read before the Health Officers Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

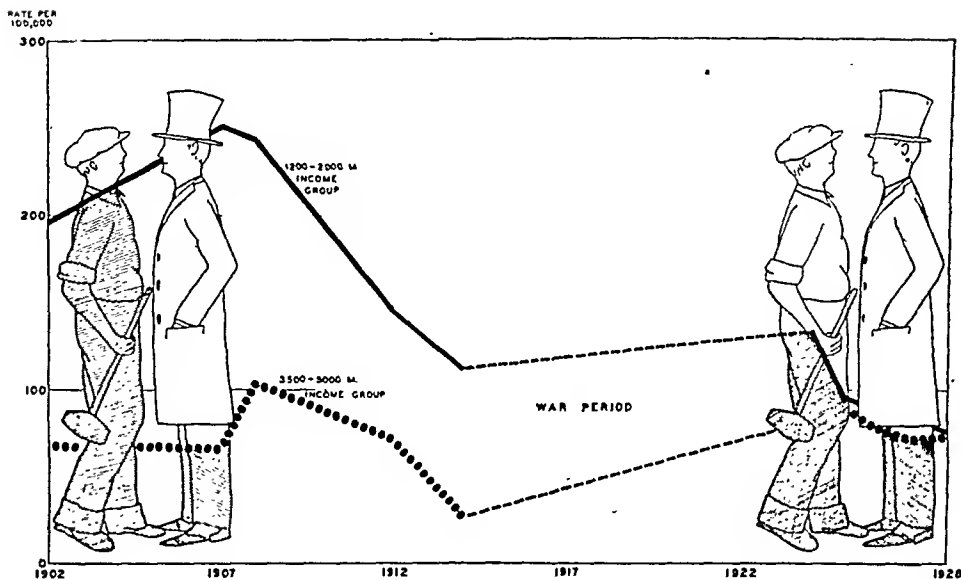


FIGURE I—Tuberculosis death rates per 100,000 for income groups of 1,200-2,000 and 3,500-5,000 marks. Hamburg 1902-1914; Baden 1924-1928. Allowances are made for changes in value of the mark and these income groups include only taxpayers without dependents

duce the tuberculosis mortality concurrently we have reached a point where far more intensive methods of control must be applied to secure comparable progress in the fight.

In other words we have arrived at a situation where tuberculosis control ceases to be a business enterprise with much that is mechanical in its program, and becomes an art in the sense that we use the term when describing the practice of medicine. Shotgun procedures, effective in the past, are not destined to bring similar results in the future. Already there is some evidence here and there that the rate of decline is straightening out rather than pursuing its reassuring downward career.

Stimulated by this somewhat striking observation in Hamburg, I asked my statistical department for any evidence which our own records might disclose. A means lay fortunately at hand. The Metropolitan Life Insurance Company maintains its own mortality rates for tuberculosis. They represent the fatal occurrence of the disease among a very large group of industrial workers including varying social levels but excluding

in some measure at least those members of society to whom we refer as belonging to the privileged classes.

Against the Metropolitan graph we have placed the graph for the whole population (Figure II) and we see at once a striking resemblance to the somewhat related study made in Hamburg. Certainly it would appear to be a reasonable inference that in our own country the rough work of tuberculosis control had accomplished its more picturesque achievements and that now we may well assume that we are settling down from a period of rapid advance against a more obvious enemy to a perhaps longer period of trench warfare where our objectives are not nearly so visible and our hope of rapid progress is much less secure.

Realizing the crudity and incompleteness of these two studies I should not have ventured to present them save as corroboratory evidence in justifying two changes in program which mark the future plans for tuberculosis control. The first of these is the recognition for some time past that while general improvement in standards of living is

still to be fostered as vigorously as before, special attention must be focused on selected industrial groups and on certain racial subdivisions of our people where a lag is revealed by our more intensive statistical research. Already this change in our aim has begun, already we are beginning to use the rifle in place of the old shotgun and to shoot at predetermined targets, instead of blindly at the whole flight of birds as we have done with admitted success in the past.

But a few years ago there was in operation an extensive campaign to eliminate dust from industry on the ground that all dust was irritating to the lungs and therefore predisposed to tuberculosis. That was wise for the moment, since minimum quantities of dust make for maximum comfort to employees and perhaps lead to increased

efficiency. But it was a shotgun procedure for it was soon learned that many dusts appeared to have little if any effect on the actual development of subsequent disease. Then it was that the rifle was brought into use instead, the sights adjusted and the true targets, silicosis and asbestosis, clearly recognized. A late report from Vermont shows that despite our knowledge of this fact and our efforts to control epidemics among granite cutters the rate of incidence has shown steady progress right up to the present time. No better illustration of the need for selecting our targets could be adduced.

Another step for the immediate future is the adaptation of general procedures to the special requirements of tuberculosis control among the several racial groups, Negroes, Indians, Mexicans, which compose a measurable fraction of

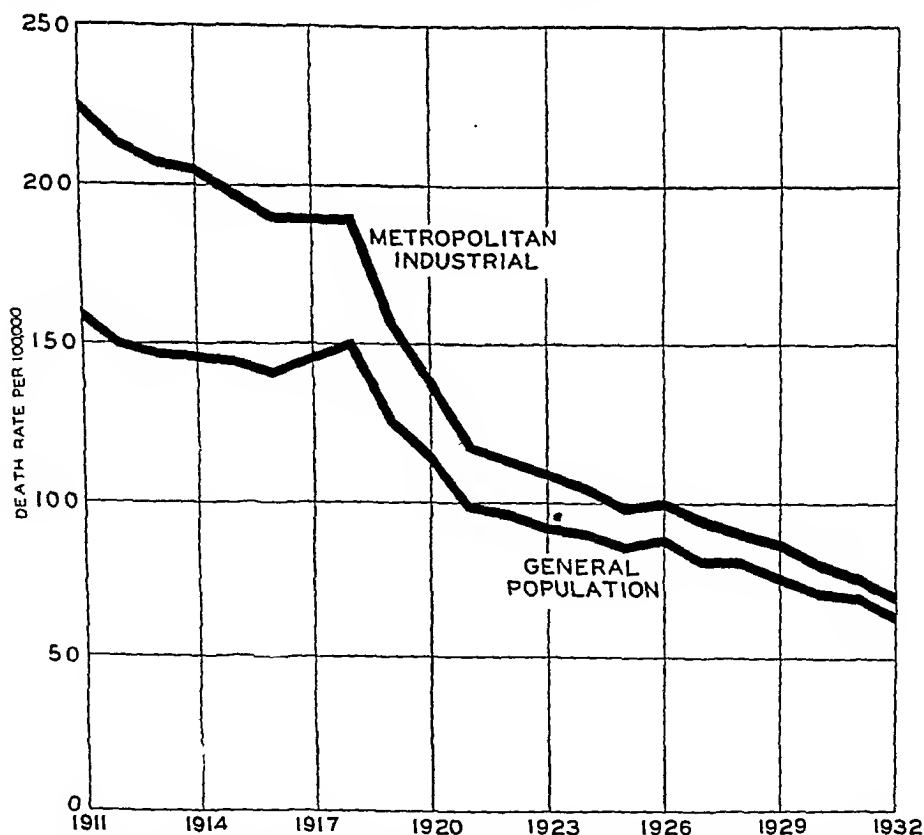


FIGURE II—Tuberculosis death rates per 100,000 for Metropolitan industrial policy holders and the general population in the United States Registration Area, 1911–1932

our population. Hitherto it has been found that control methods applicable to the people of the country as a whole yield disappointing results among certain of the subdivisions of population. Why is this? The N.T.A. is attempting to aid in answering the question through the activities of a Committee on Tuberculosis among the Negroes which operates under a grant from the Julius Rosenwald Fund. We feel a deep interest in the effort on the part of the new Indian Commissioner to attack the similar problem presented by the 600,000 wards of the federal government resident on the Indian Reservations.

In addition to the more accurate direction of the tuberculosis control program along industrial and racial lines, there are certain high spots in the mortality graph corresponding to different age groups in the two sexes, and also unfavorable variations in the case of certain professions, among which are those of the physician, the trained nurse, and assistants and technicians in sanatoria and general hospitals. Certain alarming reports regarding the danger to such professional groups have been contradicted, but the actual facts are still too doubtful to justify a feeling of security, and intensive study of the existing situation is first needed, after which consistent measures must be devised to install every practical means of prevention.

The second inference which may be drawn with reason from the observed facts of epidemiology in these two charts is that there may be biological factors of unrecognized significance in their possible influence on our efforts to eliminate the disease. The school of thought which suspects fundamental differences in the human soil upon which the disease may chance to be implanted has a potent argument in the well known contrast in susceptibility to tuberculosis between different species of animals, such, for example, as the dog on the resistant,

and the guinea pig on the highly sensitive end of the scale. The slight but recognized advantage which the Jewish race holds over the general rate may be another evidence of this principle or, as some believe, may be due to social and dietary variations. The notably profound susceptibility of the Negroes and the well known depredations of the disease when introduced into the virgin soil of primitive races also present problems for study and solution upon which must be based certain phases of any wise program for the future.

The story of communicable disease control is inextricably entwined with the advance in our knowledge of the specific bacteria. The tubercle bacillus is among the bacteriologists' oldest acquaintances, yet to the present it remains one of a small group of acid-fast bacteria which refuse to render up certain indispensable information regarding their biological peculiarities. For nearly a decade the N.T.A. has prosecuted intensive research into the behavior and chemical composition of the tubercle bacillus. No ultimate goal is set though the hope of guidance toward the discovery of a specific cure is of course a basic motive underlying this work. Up to the present much carefully recorded pioneer work in chemical and physical analysis of the bacilli has been accomplished, work which has been costly both financially and in human effort, but which will scarcely require repetition, and which adds an ever broadening foundation to build upon in carrying forward future experimentation. The association's program contemplates not only maintaining the studies now in process but seizing eagerly any promising new leads which may present themselves and call for an expansion of the present research policy.

In the field of treatment the expanding employment of approved surgical procedures has made rapid progress.

This development has an important bearing on the epidemiological control of tuberculosis because one of its gratifying results is to render the patient's sputum free from infecting bacteria at a much earlier period, thereby reducing his social menace as a carrier of the disease. We thus have another resource to supplement the policy of segregation upon which much of the present accomplishment depends.

Finally, the future program of tuberculosis control must take solicitous heed of the needs of the arrested case. Ten years ago I requested some statistics from one of our long established state sanatoria regarding its discharged cases and was shocked to receive a reply to the effect that due to the difficulties involved no follow-up records were kept after the return of a patient to his physician or to a local health authority. The difficulties referred to included serious lack of coöperation on the part of the patient himself who did not wish his history of infection to become a social or industrial handicap to his future. A decade of education and training of patients has notably altered this mental attitude and impressed upon them the necessity for supervised read-

justment to normal life if they are to avoid recrudescence of the disease. The rehabilitation of the arrested case is recognized, not only as a part of essential treatment for the benefit of the patient, but as a specific public health function in order to reduce the danger to a community of reactivation with its renewal of infectivity.

Evidence is lacking of revolutionary changes in the future program of tuberculosis control. Sanitation, avoidance of overcrowding, industrial hygiene, and good standards of living are its basic features. Early diagnosis with tuberculin testing and X-ray must continue. Clinics and sanatoria with the preventorium type of care for contact cases must be provided. The follow-up and after-care of arrested cases must be intensified. It is only by the refinement of these measures in the light of accumulating knowledge that we may carry on a gradually successful warfare until that happy moment when there shall be raised up a man of genius to present us with a specific means of curing or preventing tuberculosis.

REFERENCE

1. Flatzek-Hofbauer, Alfred. *Kommen und Gehen der Tuberkulose*. Leipzig, 1931.

Recommended Procedures for Diphtheria Immunization

THE Sub-Committee on Evaluation of Administrative Practices of the Committee on Administrative Practice of the American Public Health Association on the basis of studies made at its request by William H. Park, M.D.* offers the following as representing the best contemporary practice in immunization against diphtheria:

Passive Immunization—Limited in application to persons known to be, or presumed to be susceptible to diphtheria, who are exposed to direct contact with a case of this disease, or who remain in the family or household where there is a case of diphtheria in the communicable stage of the disease, under such conditions of unavoidable personal contact as would be likely to lead to infection. Included in this category are Schick-positive children in institutions where one or more cases, or carriers of the virulent form of diphtheria bacillus, have been discovered among the inmates of the institution.

A single intramuscular injection of diphtheria antitoxin of 500 to 1,500 units according to the size of the person (500 for a child up to 5 years of age; 1,000 for a child of 10; 1,500 for an adult) will protect for not more than 3 weeks or less than 10 days. If for a good reason protection beyond the 3 weeks by passive immunity is subsequently found to be necessary, repetition of the same dose will protect for not more than an additional 10 days.

Active Immunization—All healthy infants at 6 to 12 months of age should receive a single subcutaneous dose of 1 c.c. of an alum precipitated toxoid preparation, authorized by the National Institute of Health. This procedure can be relied upon to produce a Schick-negative condition within 2 months, in 95 per cent of such children. Small lumps may be palpable in the tissue at the site of the inoculation for several weeks while the relatively insoluble precipitated toxoid is in process of absorption. The maximum percentage of Schick-negative reactors will be found by 3 months from the date of inoculation. No appreciable annoyance to infants or to children up to 6 years of age results from the use of alum-precipitated toxin in the above described manner. If used in older children, or in adults a considerable local reaction may develop in 5 per cent of persons, and occasionally also a constitutional reaction. Local or constitutional reactions rarely last more than 24 hours. The local reactions may be alleviated by dressings wet with saturated aqueous solution of boric acid.

In persons 6 years of age or over a small dose (0.1 c.c.) of the alum precipitated toxin should be given, and if this causes no annoying reaction within 24 hours one dose of 1 c.c. may be given 1 or preferably 2 weeks later.

If the soluble toxoid preparation is used instead of the alum precipitated toxoid the infant at 6 months of age should receive 1 c.c. subcutaneously or intramuscularly in each of two doses, with an interval of 1 or 2 weeks be-

* Part of the cost of these studies was met out of grants from the Commonwealth Fund for evaluation of public health procedures.

tween them. In 90 per cent of children from 6 months to 6 years of age a negative Schick reaction will develop in previously positive Schick reactors within 3 weeks of the date of the inoculation.

In older children and in adults an initial dose of 1 c.c. is followed, if there is no severe reaction, by a second dose of 1 c.c. after 1 week interval.

If toxin-antitoxin is used in a fresh preparation of suitable toxicity, as many as 80 per cent of Schick-positive children (6 months to 6 years of age) will develop a Schick-negative reaction in the course of 3 months after the completion of a series of three subcutaneous or intramuscular inoculations of 1 c.c. each given at intervals of at least 1 week, and preferably of 2 weeks, between first and second, and second and third doses. In older children the same preparation, doses, and intervals will produce similar results, but the maximum percentage of Schick-negative results may not be reached before 6 months from the completion of the series of three inoculations.

The toxin-antitoxin mixture less often causes reactions in children over 6 months of age and in adults than do the soluble and alum precipitated toxoid preparations, and for this reason the familiar and original toxin-antitoxin is the preparation of preference for persons of school age or older requiring active immunization against diphtheria. Unless the toxin-antitoxin is of the proper degree of toxicity, not more than 50 to 70 per cent of school children or adults are likely to show a change from positive to negative Schick reaction within 3 months of the completion of the series of three inoculations as above described.

Persons who continue to show a positive Schick reaction after one such series of three toxin-antitoxin doses may develop a negative Schick reaction after a second series.

Only in the case of adults exposed to

particular hazard of infection with diphtheria, such as attendants, nurses, and physicians serving in children's and particularly communicable disease hospitals, is it important to carry out a second series of such inoculations in those showing a positive Schick reaction after the first series.

Schick testing—Except for epidemiological purposes and to determine the immunizing effectiveness of a preparation not previously used, there is no particular value in routine Schick testing infants or children between 6 months and 6 years of age, either before or after the use of the single dose of alum precipitated toxoid. In only such children of 6 years of age or over, and adults as have been proved to be susceptible to diphtheria by development of a positive Schick reaction, should active immunization be undertaken, and in these a Schick test should regularly be made 6 months after the completion of the inoculation, whatever the preparation which has been used, to determine whether they have by that time become immune.

The advised choice of age of person, preparation, and dose to give best results for the person and the community, at least individual inconvenience and cost is as follows:

A. Infants at 6 months: Alum-precipitated-toxoid. One dose of 1 c.c., without prior or subsequent Schick testing. Minimum of reactions and maximum per cent of active immunization produced.

B. Children from 6 months to 6 years of age: Same procedure as in A. Reactions slightly increasing with age but unimportant.

C. Children 6 years of age and over, and adults, known to be susceptible to diphtheria: Fresh and adequately toxic toxin-antitoxin mixture in three 1 c.c. doses at intervals of 2 weeks, followed by a Schick test, at the end of 6 months to determine presence or absence of

immunity, with a second series of inoculations for those still showing a positive Schick reaction whose occupation exposes them to a particular hazard of infection.

Only by using toxoid preparations, of whatever variety, with high antigenic potency, at least as high as now required by the National Institute of Health, can the highest percentages of actively immune persons be artificially

developed by use of the single dose of alum-precipitated-toxoid.

HAVEN EMERSON, *Chairman*
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HENRY F. VAUGHAN
JOSEPH W. MOUNTIN
W. F. WALKER

Obstetrical Mortality in the United States and Abroad

IN recent years many obstetrical papers have discussed the high puerperal mortality rate of the United States. Much has also been written of the unfairness of comparing the maternal mortality of this country with that of others.

It was concluded by Tandy that the methods of assignment in use in Australia, Netherlands, New Zealand, and Scotland are similar to those of the United States, and the official maternal mortality rates are directly comparable within a small margin of error. Under the method of Denmark a larger number of deaths would be assigned to the puerperal state and the rate for the United States would be significantly higher than now. Under the methods of the other countries included in the study, a smaller number of deaths would be assigned to the puerperal state and the rates for the United States would consequently be lower.

Differences in methods of assignment were insufficient to explain the high maternal mortality rate of the United States as compared with foreign countries. The official figure of the United States, which in the last few years has exceeded that of every country except Scotland, remains high no matter what method of assignment is used.

Even if the method of the country assigning the smallest proportion of deaths to the puerperal state were in use in the United States, the United States figure would still exceed that of all the countries except Australia, Canada, Chile and Scotland. Rates for the United States estimated in accordance with the assignment procedure of the respective countries are in every instance except Scotland in excess of, and are in five instances more than double, the official rates of the countries themselves.—*South. M. J.*, 28, 4:388 (Apr.), 1935.

Selling Health Department Members First on Health Education*

HUNTINGTON WILLIAMS, M.D., DR.P.H.

Commissioner of Health, Baltimore, Md.

THOSE who selected the subject that I have been asked to discuss must surely have had in mind a fairly obvious fact and one which is not given the attention it deserves from health department executives. This fact is that the health education efforts of health departments are usually directed toward the general public as an audience without making use of the entire health department staff, including not only the medical and nursing members but also every stenographer, inspector, and routine worker as potential public health missionaries. I imagine the motive back of this meeting amounts to a challenge which many health departments, including the two with which I have been associated, are not in a satisfactory position to accept.

To be a little more specific, the question seems to be: First, just how interested are the rank and file of employees in a health department in the more vital field programs, such as diphtheria prevention, or the protection of 1 year old babies from exposure to measles during a brisk outbreak? Second, if it is considered desirable, how can a health department best organize and stimulate an interest throughout its entire staff which would result in their presenting to their

friends and acquaintances, while not on duty in the office, the content of the health education program the department is most anxious to spread abroad at any given time?

It occurs to me that some of you may be interested in certain extracts from replies which were received during the summer from a number of health officers to whom I presented the problem for comment. From one city came the following:

In reply to your letter of June 12, I wish to state that we agree with you that only too often do the routine workers in the various bureaus become lukewarm in regard to the program which the department, as a whole, is anxious to develop.

We are trying to overcome this . . . by meetings with brief talks to the workers, giving them the necessary instructions and, at the same time, trying to build up for them a background of motives or reasons for the various regulations and rules, thus getting them interested in carrying forward the work which we desire done.

Another city health officer wrote:

After looking over our various printed instructions to employees, I have reached the conclusion that we really have not anything to offer on the education of the Health Department personnel.

Nearly all of our work is done through conferences. The department heads meet at least once a month with the Commissioner of Health to discuss their problems. The various department heads educate their employees through personal contact and group meetings. The various department heads also give a course of lectures to the public health nurses. The Commissioner and Deputy Commissioner

* Read at a Joint Session of the Health Officers and Public Health Education Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 5, 1934.

of Health give occasional talks to the large groups of employees.

One of the most interesting letters, from a smaller city, included this statement:

During the 10 years that I was Health Officer in . . . , one of the most effective methods for keeping the personnel of the Health Department stimulated, informed and interested in public health work was through our weekly and bi-weekly staff conferences.

The entire personnel of about 70 were present at these Saturday morning meetings. The programs included outside speakers on a wide variety of health topics, and also speakers from within the department informing the rest of the group of their specialty.

On some occasions these meetings went as far as a debate as to the relative value of the type of work that they were doing. The Health Officer, himself, gave a good many of these talks which covered all kinds of health topics from book and magazine reviews, outstanding epidemics in the country, to frank presentation of difficult situations within the department.

Dr. Geiger, whose public health work in San Francisco is a constant inspiration to his friends in the eastern part of the country, called attention, in connection with our problem, to the genuine need for an *esprit de corps* among all the employees in a health department. My predecessor, Dr. C. Hampson Jones, who for so many years was responsible for the public health of Baltimore, was singularly fortunate in his constant efforts to develop what he referred to as "the public health spirit" among nearly all the 535 workers on his staff. Dr. Geiger has pointed out that a health department should have a full-time director for the Bureau of Education who should organize regular classes for employees as well as assume responsibility in the field of health education for the public. This would include planned graded classes as well as special lectures on occasions. Just how far behind many of us are in what we would like to see in the staffing of a public health education bureau in a

health department, I may best indicate, perhaps, by referring to the one full-time public health nurse who with the assistance of a stenographer acts as health education director for us in a city of over 800,000 population. Of course, the answer is that other bureau directors and their assistants coöperate and are responsible for a very large share of our public health education work. Dr. Geiger points the way, as he sees it, as follows:

The full organization of a bureau of education is probably out of reach of most health departments at the present time but the (1) careful introduction of the new employee to the work, (2) a simple department manual kept up to date, (3) occasional or regular bulletins issued to each member of the department, and (4) arrangement for lectures, especially for the non-professional members, all appear not too difficult for realization.

From the Director of the Division of Public Health Education in a large state health department there was received the following:

I certainly believe that public health education, like charity, should begin at home.

I know for a fact that the rank and file in the department seldom read *Health News*, and are interested only in their particular jobs. Ask them anything outside of that and the answer is "I don't know." I do not think that this applies to the professional staff.

Some of the health habits of the rank and file, from personal observations, are what might perhaps be expected of the personnel of a 5 and 10 cent store.

Some years ago in the Capitol, I attempted to start a series of health lectures in the department for the clerks and stenographers, etc. I did succeed in holding a few meetings on social hygiene, but the plan then fell through, partly because of the opposition of directors to giving the employees the necessary time.

The Health Commissioner from another large city has written me:

I feel as you do that it is very important to have some one detailed to the Health Department who gives his entire time to health educational methods. Only in this way can we get over the problems that are continually confronting us. . . .

A broad program of public health education has not been properly organized in . . . up to this time.

Dr. Boucher, Director of Health of the Health Department in Montreal, has written that in his department the employees are gathered together in groups in the different divisions, and under supervisors each week are given information and instructions on health department work in a manner which allows of questions and answers and discussion. In addition more formal lectures are presented and Dr. Boucher feels that these procedures have given splendid results.

From Detroit Dr. Vaughan has written as follows:

It not infrequently happens, I am sure, in many of our large city health departments that we, as Health Officers, fail to carry along in our various projects the rank and file of our own employees. Here in Detroit we have not done as well as we should. Our sanitary inspectors as well as our milk and food inspectors have their regular bureau meetings at which they are thoroughly instructed with respect to their own activities, but we have been somewhat negligent in carrying to them the more complete program of the Department of Health, that is, those activities with which they do not have daily contact.

With our nursing personnel the contrary is true . . . We are looking forward to the time when all of our nurses will not only be graduate nurses but also have a certificate in public health nursing . . .

The courses at the University are closely tied up with the Health Department and the teachers are, to some extent at least, members of our staff . . .

For the past 15 years we have had executive staff meetings in my office . . . All the new procedures are outlined at these staff meetings . . . Each responsible sub-chief in turn must carry these programs to his respective bureaus and divisions.

Briefly, to answer your question I would say that the 3 important tools to be employed are: first, regular methodical meetings of the executive staff; second, regular meetings of the employees in their respective divisions; and third, a tie-up with an institution of learning so as to give the employees, especially the nurses, some academic standing for their work.

Like Dr. Vaughan, we have regular staff conferences of the bureau directors in the Baltimore Health Department which have certainly been valuable in integrating the interests of the different health services. During the past 3 years we have been in a state of fairly complete reorganization resulting, in part, from a 33 per cent budget reduction. One of the most profitable projects in our staff education was the assigning of Professor Hiscock's book *Community Health Organization* to each bureau director for a written review of the chapter dealing with his special activity. These reviews included a comparison of the Baltimore program with the recommendations. This staff study, which is being followed by a similar review of the New York State Health Commission Report of 1932, has turned out in many ways to have been more valuable than had been anticipated.

With the establishment of the Eastern Health District in Baltimore as an administrative unit serving slightly less than 10 per cent of the city population, and made possible through the coöperation of the Johns Hopkins School of Hygiene and Public Health and a number of volunteer health agencies with the City Health Department, there has been afforded an opportunity for field education of our public health nursing staff and some of our medical officers. Dr. Harry S. Mustard, who is Health Officer for the Eastern Health District, has been of the very greatest assistance in the development of an entire course of instruction for our 118 public health nurses prior to the generalization of 2 nursing units; a maternity and child hygiene group of about 25 nurses, which has this summer been merged with the other group of 93 public health nurses, who have been carrying district assignments including school, communicable disease, and tuberculosis work. The other large body of employees who, for a number of years, have been receiving

fairly formal instruction, have been the inspectorial group, including the dairy farm and pasteurization plant inspectors, the sanitary and plumbing inspectors and, more recently, a newly established classification of industrial hygiene inspectors. The Bureau of Laboratories has assisted in all these educational projects.

Perhaps the only other educational effort which has been developed is the annual health examination of all of the 411 employees now on our staff who have volunteered to accept these personal health surveys, rendered without cost by a group of department physicians. Quite naturally certain members of the staff have preferred to have the examinations done by their family physicians.

In questioning a group of our stenographic force, I found that one had been responsible for the toxoid inoculation of her sister's child after there had been a considerable delay because the family physician apparently did not believe in the procedure. Another one also told me that her nephew had been inoculated at the time he reached the age of 6 months, in part at least, because of her urging, although she said that 3 other babies who were treated at a clinic and who were children of her sister's close friends, had probably received the stimulus more from the direct publicity campaign of the health department than from casual association with members of the department staff. The clerical force and others in the department take a considerable interest in reading the texts of the weekly 5-minute radio messages, which are broadcast under the joint auspices of the City Health Department and the State Medical Society. A similar interest is taken in the monthly department publication known as *Baltimore Health News*, and in other printed material put out from time to time by the department. There is, however, a definite lack of planning for

staff education other than in the instances I have mentioned.

It would seem that health departments in this matter might well learn a lesson from the selling and advertising methods of certain big industries. During the recent years of depression, I am told that a large national electrical supply company made it clear to all its workers that they were potential salesmen and perhaps their jobs might depend on the efforts they put forth toward an increasing sale of the company's products. In the annual report sent to stockholders the company called attention to this effort of the employed staff and indicated that stockholders too might be better assured of continuing dividends should they purchase the products of their own company and mention them to their friends. I know that these efforts resulted in definitely increasing the business of the company and it would seem that it was an educational project which had certain similarities with the problem of selling health education to the staff members of a health department.

Perhaps imagination and initiative are all that are really needed if we are to dramatize to ourselves the possibilities in staff education. At the same time we should realize that a little scientific information, or perhaps misinformation, in the hands of untrained persons may not be without its dangers. Technics in public health education and in salesmanship and advertising are developing, if anything, a little more rapidly than they may be safely assimilated. However, I do believe we may well take a long range view of this matter and try to build in slowly a very firm educational foundation within our health departments.

Solid foundation-laying is excessively time-consuming. Anyone knows this who has watched the demolition of an old building and the preparation for a modern skyscraper. The ancient Vishnu

schists, the rock foundation lying at the bottom of the Grand Canyon, are over 1,000 million years old. The tremendous earth changes that have taken place in the Canyon area, some of which have left no visible trace of themselves, impress one with two quite conflicting thoughts:

The first is the apparent futility of our pigmy-like human efforts in a civilization which itself is the thinnest of veneers on our ageless organic and inorganic inheritance, a civilization which is constantly showing an aptitude for self-destruction; the second is the imperative nature of some inner urge

which drives us on to do our utmost, in spite of this seeming futility.

The record of the rocks is clear. Foundation-laying, then, in health education as in other fields takes time, and patience, and more time—with a deal of thinking interspersed as an essential mortar if solidity is desired. We should, even at best, expect mighty and unpredictable forces which will warp, twist, uplift, or flatten out our best efforts. Yet, without taking ourselves too seriously, and conscious of the age-old time-relationships as we see them all about us, each one of us must go on and do his best, and each one in his own way.

Hospital Survey for New York

A HOSPITAL survey for the New York Metropolitan area, sponsored by the United Hospital Fund, and provided for by a grant from the Carnegie Foundation, has been put into the hands of Dr. Haven Emerson, as Director of Studies, and Dr. Gertrude Sturges, as Assistant Director, with Dr. George E. Vincent as Chairman of the general Survey Committee of leading citizens, and David H. McAlpin Pyle as Vice-chairman. The actual prosecution of the work will be in the hands of a study committee composed of the following persons:

S. S. Goldwater, M.D.
Charles Gordon Heyd, M.D.
John E. Jennings, M.D.
Eugene H. Pool, M.D.
Willard C. Rappleye, M.D.
Nathan B. Van Etten, M.D.

The area includes, as well as the City of New York, the Counties of Westchester and Nassau in New York, the towns of Greenwich and Stamford in Connecticut, and all of Essex, Hud-

son, and Union Counties, and parts of Bergen and Passaic Counties in New Jersey, comprising an area of 1,535 square miles and a population as of 1930, of 10,247,895.

The survey will include in addition to its study of hospitals, a study of the 6 accessory activities in the field of organized care of the sick, as follows: Out-patient services, convalescent homes, Institutions for the chronically sick, Visiting nursing, Medical social service, and Domiciliary medical care.

A feature of this study upon which special emphasis will be placed, is the financial statements of these assembled public utilities, not only from the point of view of the current or annual balance sheet, but in the form of a stockholders statement of the total investment in land, buildings, endowment, etc. It is hoped that on the basis of this survey an approximate estimate of the projecting needs of the 18 million people who will be occupying this area in 1965 may be described.

Routine Use of a Modified Eijkman Medium in the Examination of Oysters, Crabmeat, and Other Substances

C. A. PERRY, Sc.D., F.A.P.H.A., AND A. A. HAJNA

Bureau of Bacteriology, Maryland State Department of Health, Baltimore, Md.

THE Eijkman test for *Bacillus coli* has been used and studied in the laboratories of the Bureau of Bacteriology of the Maryland State Department of Health since 1929. One of the authors (Perry, 1929), first applied the test to a number of cultures of *Bacillus coli* recovered from oysters and oyster bearing waters. He found "such cultures invariably produce indol from a suitable medium and were able to ferment the dextrose of Eijkman broth with gas at 46° C." He also found that "only 11.2 per cent of 223 cultures of lactose-fermenters (coli-aerogenes group) from oyster and water samples from four areas were *Bacillus coli*. The four areas differed geographically, topographically, and in respect to their sanitary features. The presence of *Bacillus coli* was found in close agreement with probable fecal pollution."

In Maryland, a systematic study of oyster producing waters and the oysters themselves has been in progress since 1925. It became obvious from these studies that an evaluation of the coli-aerogenes group content of oysters is of little, if any, practical value (Perry, 1928). While considerable difference of opinion exists among bacteriologists and others whether *B. coli* or the coli-aerogenes group should be used as an index of pollution in drinking waters, in the field of fecal pollution in oysters and

oyster waters the coli-aerogenes group has been found unsatisfactory as it gives information of little if any value for oysters and of comparatively less value than *B. coli* for oyster bearing waters. For the past year (1934), determinations of the *B. coli* content (score and probable number) of oysters using the modified Eijkman medium of Perry and Hajna* (1933), and standard lactose broth (American Public Health Association) have replaced those of the coli-aerogenes group. As yet, no attempt has been made to correlate these data with pollution. Most of the samples have been taken from waters free of any significant fecal pollution and the *B. coli* scores of the oysters usually have been very low. While the coli-aerogenes group has been much more satisfactory as an index of possible fecal pollution of oyster waters than of oysters themselves, it has not been entirely satisfactory even for oyster waters. The coli-aerogenes group content of many waters of unquestionable purity, from the standpoint of growing oysters, has

* Modified Eijkman Medium †

Dextrose	3 grams
Peptone (Difco)	15 grams
K ₂ HPO ₄	4 grams
KH ₂ PO ₄	1.5 grams
NaCl	5 grams
Dist. water	1,000 c.c.

† If inoculum is by loop or needle, use formula as given. If by pipette, adjust so that final concentration with inoculum will be given.

been far in excess of the amount permitted by the Drinking Water Standards of the U. S. Public Health Service. This experience indicates that *B. coli* would be a much better index of fecal pollution for both oysters and oyster waters than the coli-aerogenes group. The writers also believe that *B. coli* would be just as superior to the coli-aerogenes group as an index of possible fecal pollution when applied to drinking waters.

The Eijkman test has, we believe, many practical advantages as a presumptive test for *B. coli* in oysters, water, crabmeat, and other substances. These advantages have been given by Leiter (1929) and others. That the original Eijkman medium (1904) was not entirely satisfactory has already been pointed out by the authors (1933). More *B. coli* was recovered from fresh human feces using the modified Eijkman medium referred to than could be recovered with lactose broth. In this paper, data are presented on the practical application of this test to samples of oysters, water, crabmeat, etc.

METHOD OF EXAMINING OYSTERS, ETC.

The method of examination was as follows: Five tubes of each medium (modified Eijkman medium and Standard lactose broth) were inoculated with like amounts of water, oyster shell liquor, etc. In the case of oysters, 5 tubes were inoculated with 1 c.c. each of oyster shell liquor and 5 with 0.1 c.c. (1 c.c. of a 1 in 10 dilution). In most water samples, 5 tubes were inoculated with 10 c.c. each, and 5 with 1 c.c. each. The amounts of other substances used varied according to experience but like amounts were used for both media except where noted. Lactose broth tubes were examined according to Standard Methods of Water Analysis of the American Public Health Association while the method used for the Eijkman broth tubes was that described by the authors (1933).

COMPARATIVE NUMBER OF TUBES AND SAMPLES OF OYSTERS, CRABMEAT, AND WATER IN WHICH FERMENTATION AND CONFIRMATION FOR BACILLUS COLI AND COLI-AEROGENES GROUP OCCURRED FOR EIJKMAN AND LACTOSE BROTH

In Table I comparative data are given for the number of tubes of Eijkman and lactose broth, inoculated with equal quantities of shell liquor from oysters, crabmeat, and water, in which fermentation and confirmation for *B. coli* and other coli-aerogenes organisms was made. On the basis of these data, the following deductions may be made.

The modified Eijkman medium is more selective and efficient for the isolation of *B. coli* than lactose broth. Approximately 6.4 per cent of the lactose broth tubes inoculated were confirmed for *B. coli* while 8.9 per cent of the inoculated Eijkman tubes were confirmed for *B. coli* in spite of the fact that nearly twice as many of the lactose broth as of the Eijkman broth tubes showed gas fermentation. Over twice as many of the Eijkman tubes as of the lactose broth tubes inoculated from oysters and crabmeat were confirmed for *B. coli* while a slightly larger per cent of the standard lactose broth tubes inoculated from oyster waters were confirmed for *B. coli*. Of the lactose broth tubes with gas 18.7 per cent were confirmed while 54.3 per cent of the Eijkman tubes were confirmed.

Since the Eijkman test has been designed to eliminate members of the coli-aerogenes group not *B. coli* it should be expected that many less confirmations for this group would be made from the Eijkman broth tubes. Accordingly, 27.6 per cent of the lactose broth tubes were confirmed for members of the coli-aerogenes group against 14.1 per cent of the Eijkman tubes. These figures include *B. coli* of course. The percentage of non-*B. coli* members of the coli-aerogenes group are 21.2 for

TABLE I

COMPARATIVE RESULTS, BOTH PRESUMPTIVE AND CONFIRMED, FOR *Bacillus coli* AND COLI-AEROGENES ORGANISMS IN EIJKMAN MEDIUM AND STANDARD LACTOSE BROTH FOR OYSTERS, OYSTER WATERS, AND CRABMEAT

	Oysters (shucked) 182 Samples		Oyster Water 344 Samples		Crabmeat * 229 Samples		Crabmeat † 78 Samples	
	Lactose Broth	Eijkman Broth	Lactose Broth	Eijkman Broth	Lactose Broth	Eijkman Broth	Lactose Broth	Eijkman Broth
Total tubes inoculated.....	2,195	2,195	3,239	3,233	891	2,170	801	801
Tubes having gas at 24 and 48 hr.....	1,068	422	853	406	288	425	237	126
(a) Tubes having gas at 24 hr.....	451	176	375	191	198	328	151	89
(b) Tubes having gas at 48 hr.....	617	246	478	215	90	97	86	37
Total confirmations, coli-aerogenes group...	890	366	637	352	243	363	196	105
(a) Number of 24 hr. gas tubes confirmed	374	135	338	167	181	301	134	82
(b) Number of 48 hr. gas tubes confirmed	516	231	299	185	62	62	62	23
Total confirmations, <i>Bacillus coli</i>	86	204	284	213	50	252	37	80
(a) Number of 24 hr. gas tubes confirmed	42	62	157	141	44	225	31	70
(b) Number of 48 hr. gas tubes confirmed	44	142	127	72	6	27	6	10
Per cent of tubes with fermentation at 24 and 48 hr.	48.7	19.2	26.3	12.6	32.3	19.6	29.6	15.7
Per cent of inoculated tubes confirmed for <i>Bacillus coli</i>	3.9	9.3	8.79	6.59	5.6	11.6	4.6	10.0
Per cent of gas tubes confirmed for <i>Bacillus</i> <i>coli</i>	8.1	48.3	33.3	51.9	17.7	59.2	15.6	63.5

* Determinations made on 88 samples in lactose and 229 in Eijkman broth

† Determinations made on same samples for lactose and Eijkman broth

lactose broth and 5.2 per cent for Eijkman broth.

Gas was present in about twice as many (34.4 per cent) lactose broth as Eijkman broth tubes (16.4 per cent). Of standard lactose broth tubes inoculated with liquor from shucked oysters, gas was present in 48.7 per cent against 19.2 per cent of the Eijkman tubes. Of the oyster water samples, 26.3 per cent were found to produce gas in standard lactose broth against 12.6 per cent in Eijkman broth, while gas was present in 31.0 per cent of the standard lactose broth tubes inoculated from crabmeat against 18.6 per cent of the Eijkman broth tubes. In routine laboratory work, it is not always possible to read gas production at exactly 24 and 48 hours. In many instances the 24 hours readings represent only 18 hours of incubation. If a full 24 hours incubation had been made, a much larger per cent of the Eijkman tubes doubtless would have been confirmed for *B. coli* and a much smaller residual number, consequently, would have been confirmed after 48 hours of incubation.

From these data, it is obvious that, using Eijkman rather than lactose

broth, a bacteriologist has only one-third the number of presumptive tests for *B. coli* to confirm. There is less work involved in confirming presumptive Eijkman tubes than presumptive lactose broth tubes, for on plates made from Eijkman tubes, *B. coli* is often the only organism present while on plates made from lactose broth tubes several organisms of the coli-aerogenes group are frequently present. This necessitates increased effort to select colonies of *B. coli* and to secure pure cultures. It is much more difficult to secure well isolated colonies from lactose broth tubes than from Eijkman broth. Only occasionally are plates, made from Eijkman broth tubes, overgrown. There is, therefore, less than half the work involved in using lactose broth for the routine isolation of *B. coli*.

PROBABLE NUMBERS OF *BACILLUS COLI* AND COLI-AEROGENES ORGANISMS FOUND IN OYSTERS, WATER, CRABMEAT, ETC., USING EIJKMAN BROTH AND STANDARD LACTOSE BROTH

The probable numbers * of *B. coli*

* Tables for Rapid Interpretation of Fermentative Tube Results, M. H. McCrady, *Pub. Health J.*, IX, 5 (May), 1918.

and coli-aerogenes group organisms in oysters, crabmeat, oyster waters, milk, ice, sewage, and eggs were determined. These data are presented in Table II. *B. coli* was identified in the same manner as already described. In the last column of Table II are given the ratios of the probable numbers of *B. coli* as determined using Eijkman broth to the numbers as determined using standard lactose broth and in proportion to coli-aerogenes organisms as determined using the standard procedure of the American Public Health Association. While these ratios indicate that the Eijkman method, as used, was only half as efficient in detecting the probable numbers of *B. coli* from oysters, salt water from oyster areas, and milk as standard lactose broth, this is not really true. Much of the data prepared in Table II was collected before certain refinements in the Eijkman test were used. It will be observed, for instance, from Table I, that over twice as much *B. coli* was isolated from oysters using Eijkman broth as in using lactose broth. In our earlier work on fresh human feces (1933 results confirmed by recent work) more *B. coli* was isolated using Eijkman broth than by using standard lactose broth. The number of samples of ice, eggs, and sewage is too small to be of much significance, especially since these observations like-

wise were made before improvements in the Eijkman method had been applied.

A most significant point is the tremendous difference between the average number of *B. coli* in 83 samples of oysters and the average number of coli-aerogenes group organisms. With coli-aerogenes organisms outnumbering *B. coli* 50 to 100 times (depending on the method), comparatively small variations in the probable numbers of *B. coli* as determined by the two methods becomes of comparatively less significance. In oyster waters, the ratio of coli-aerogenes organisms to *B. coli* was 3 to 5 times as great. This is what those with experience in this type of work would expect. In crabmeat 4 to 7 times as many organisms of the coli-aerogenes group as *B. coli* were found.

To the writers, these data signify the tremendous error in trying to evaluate fecal contamination of oysters, in particular, on the basis of the coli-aerogenes group and indicate quite clearly the desirability of using *B. coli* generally as an index of fecal pollution.

SUMMARY AND DISCUSSION

A modified Eijkman medium with incubation at approximately 46° C. has been used for the routine examination of samples of oysters, crabmeat, salt water in which oysters grow, sewage, and other substances.

TABLE II

AVERAGE PROBABLE NUMBER OF *Bacillus coli* RECOVERED FROM OYSTERS, ETC., BY EIJKMAN BROTH AND LACTOSE BROTH AS COMPARED WITH THE AVERAGE NUMBER OF COLI-AEROGENES ORGANISMS FROM LACTOSE BROTH

Substances	Number of Samples	<i>Bacillus coli</i> *		<i>Coli-aerogenes</i> *		Ratio a-b-c
		Eijkman Broth (a)	Lactose Broth (b)	Lactose Broth (c)		
Oysters	83	3.5	9.1	362		1-2.6-103.2
Oyster waters (salt)	229	5.2	9.4	28.8		1-1.8-5.5
Water, fresh (heavily polluted)	11	431,634	107,582	1,109,514		1-0.25-2.6
Ice	6	270.8	1,483.0	1,512.5		1-5.5-5.6
Sewage	3	68,333.3	93,333.3	93,333.3		1-1.4-1.4
Eggs	2	14,000+	7,700+	14,000+		1-0.55-1
Milk	15	49.3	144.7	369.3		1-2.4-7.5
Crabmeat	135	628+	418+	2,741+		1-0.67-4.3

* Probable Numbers per 100 gm.

NOTE: Acknowledgment is made of examinations by bacteriologists as follows: A. A. Hajna 123, H. B. Robinson 192, J. H. Dingle and A. A. Hajna 117, T. F. Dozois and R. T. Humiston 25, S. R. Pence 20, C. A. Eddy 7.

The presumptive and confirmed tests for *B. coli* (so-called fecal type) and organisms of the coli-aerogenes group were made on 182 samples of shucked oysters, 344 samples of salt water from oyster areas, and 307 samples of crabmeat. In this work the term "presumptive" refers to any amount of gas produced in either lactose broth or dextrose (Eijkman) broth. In regard to the shucked oyster samples, approximately 3.9 per cent of 2,195 inoculated lactose broth tubes confirmed for *B. coli* against 9.3 per cent of the same number of tubes of Eijkman medium. Of 3,239 and 3,233 tubes of lactose and Eijkman broth respectively inoculated with salt water from oyster areas a little over 2 per cent more of the lactose broth tubes than the Eijkman broth tubes (8.79 and 6.59 per cent respectively) confirmed for *B. coli*. Of 166 samples of crabmeat inoculated into lactose broth 5.1 per cent of the tubes were confirmed for *B. coli* against 11.2 per cent of 307 samples inoculated into Eijkman broth. On the whole, gas was present in less than half as many Eijkman tubes as lactose broth yet more (2.5 per cent) *B. coli* was recovered from the Eijkman broth tubes than from lactose broth tubes, thus establishing the superiority of the Eijkman method under the circumstances noted.

In another series of samples the probable numbers of *B. coli* isolated from Eijkman broth and lactose broth were compared with the numbers of organisms of the coli-aerogenes group. The data given in Table II were collected in the earlier part of this study when an incubator temperature of approximately 46° C. was used. The variations are believed to be due to a different bacterial flora in these samples which tend to suppress *B. coli* in the Eijkman medium. On latter samples a tube temperature of 46° C. rather

than an incubator temperature of 46° C. was used and more *B. coli* was then recovered apparently, by the Eijkman test than by lactose broth. Such a tube temperature was used in some of the 182 samples of shucked oysters in Table I. In 135 samples of crabmeat and 2 samples of eggs the estimated probable numbers of *B. coli* isolated by the Eijkman method were nearly twice those isolated from lactose broth, while in 11 samples of heavily polluted water 4 times more *B. coli* was isolated from Eijkman broth than lactose broth. In 83 samples of oysters, 6 of ice, 3 of sewage, and 15 of milk greater numbers of *B. coli* were isolated from lactose broth tubes; in oysters (shell) 2.6 times as much, in salt waters from oyster areas 1.8 times as much, in ice 5.5 times as much, in sewage 1.4 times as much and in eggs 2.4 times as much.

The opinion of the authors from their rather extensive experience, is that the Eijkman test, properly adjusted, is a valuable presumptive test for *B. coli* which organism they believe should be the one generally used as an index of fecal contamination of oysters, crabmeat, water, and other substances.

BIBLIOGRAPHY

- Eijkman, C. *Centralbl. f. Bakteriol.*, 37 Orig., 742, 1904.
 Leiter, L. W. The Eijkman Fermentation Test as an Aid in the Detection of Fecal Organisms in Water. *Am. J. Hyg.*, V, 9, 1929.
 Perry, C. A. Studies Relative to the Significance of the Present Oyster Score. *Am. J. Hyg.*, V, VIII, 5:694, 1928.
 The Significance of Aerobic Non-Sporulating Bacteria Producing Gas from Lactose in Oysters and Water. *Am. J. Hyg.*, V, X, 3:580, 1929.
 Perry, C. A., and Hajna, A. A. A Modified Eijkman Medium. *J. Bacteriol.*, V, XXVI, 4:419, 1933.

ACKNOWLEDGMENT—The writers wish to acknowledge that other bacteriologists in the Bureau of Bacteriology as noted in Table II have made part of the examinations reported. They also wish to acknowledge assistance given by the Staffs of the Bureaus of Sanitary Engineering and of Food and Drugs in the collection of samples.

The Community Program of Health Education*

C. E. TURNER, DR.P.H., F.A.P.H.A. (*Life Member*)

*Professor of Biology and Public Health, Massachusetts Institute of Technology,
Cambridge, Mass.*

THE health education of an individual is not restricted to those words either spoken or written which are specifically directed toward him for that purpose any more than his character is completely determined by what he hears in church. One's ethical behavior and one's health behavior are both determined in large measure by the customs and practices of the race, the community, and the family. The child gradually recognizes and begins to participate in these practices. Standards of honesty and cleanliness are set by the attitudes and behavior of family and associates more than by theoretical considerations of ethics and hygiene.

The realization of these facts tells us two things: (1) All the experiences of the individual must be considered in determining the nature of his health education. (2) Health education to be most effective must address itself to the whole community rather than to a single group or a single age level. Let us consider the health education activities of the school, the health department, and the private health agency.

THE SCHOOL

The public school recognizes that it affects the health education of the child

through all of his experiences at school and through those health experiences outside of school which are initiated or modified by school activities. This means that the school is concerned not only with health instruction and with training in hygienic living while the child is at school, but also with the child's experiences in having physical defects corrected, and in maintaining and improving his health practices in the home, in so far as the school can beneficially influence these experiences.

The school contributes to the health education of the pupil in two essentially different ways: (1) through direct health training and instruction, (2) through those school activities which form a part of the child's health experience. Let us review briefly the scope of each of these two phases of the health education program.

A. DIRECT HEALTH INSTRUCTION AND TRAINING

1. *Direct Instruction in Hygiene*

The oldest and most universally recognized phase of health education is instruction in hygiene. When the child enters the public school he is under the authority of the home and school and his health habits reflect direct training. When he leaves the public school he is about ready to leave the authority of the home also and his health behavior must be supported by a knowledge of

* Read at a Joint Session of the Public Health Education and Child Hygiene Sections of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

the facts of hygiene. We must begin with health training and gradually through public school experience we must place a foundation of knowledge beneath these health practices which will support them with wise and intelligent adaptations in the years to come.

In the first 3 grades the knowledge content of the program is relatively unimportant and no formal or set health instruction need be prescribed. Beginning with grade 4 and continuing to the end of junior high school, the present tendency is to provide specific instruction for at least 2 class periods a week with a program which is sufficiently different and new in approach each year to make the subject, with its necessary repetitions, fresh and interesting to the pupil.

For example, in grade 4 the child may be chiefly concerned with "What is health training," or the way in which the detailed rules of the health game are carried out. In grade 5 he may be interested in "Why these health practices are desirable." In grade 6 he studies biological cleanliness and its relation to the health of the individual and the family. In grade 7 he studies community hygiene, in grade 8 elementary descriptive physiology and in grade 9 physiology and foods with home nursing for the girls and first aid for the boys.

In the senior high school there will be some direct health instruction, but it is doubtful whether a regular period for informational hygiene should be assigned throughout these 3 years. It may be better to contribute to health instruction through other subjects, particularly science, social science, and biology, and to have a single course in health problems for those high school seniors who are not going to college. Training in physical education has an increasing influence upon the maintenance of healthful living as the child advances in the grades.

It must not be thought that the class-

room period of health instruction is restricted to the presentation of information. It is used to provide an opportunity for centralizing all educational activities. Through it pupil activities of vital interest are developing and in it health experiences are reviewed.

2. *Integrated Health Instruction*

In addition to the regularly organized instruction in hygiene, health is taught to a considerable degree in connection with the teaching of other subjects. This may be done by using health facts in connection with such subjects as art, arithmetic, and geography, or by integrating health with the other subjects in units of work where the partitions between the different subjects have been removed.

It has occasionally been urged that complete health instruction could be developed in this way, but authorities now generally agree that direct instruction is needed and that integration is more successful with direct instruction than without it.

3. *Health Training Through Watching Growth (Monthly Weighing)*

Regular and continued growth is a sign of health and the child who is interested in growing is willing to follow those health practices which will help him grow. Monthly weighing has come to be a valuable means of health training.

4. *Health Training Through Inspection and the Recording of Health Practices (Morning Health Review)*

The training of the pupil is effectively developed by the regular checking of cleanliness and neatness and by keeping records for short periods of the success of the class in maintaining different health practices. For this reason it has become a nearly universal practice to use a few minutes at the opening of school in the morning for purposes of health training.

These are the 4 important procedures

in direct health training and instruction. Let us now consider those other activities of the public school which affect the child's knowledge but more specifically influence his attitudes and practices.

B. OTHER SCHOOL ACTIVITIES WHICH
DETERMINE IN PART THE CHILD'S
HEALTH EXPERIENCES

*1. The School Presents Its Program
to the Home*

The school has a program of instruction and standards of behavior which the child is expected to meet. Parents want to know what the program and standards are and what progress the child is making in the different problems of behavior and in the different subjects of instruction. The school tells them what it is trying to do from year to year in the health training of the child. The activities of the school in establishing home and school relationship and coöperation directly affect the pupil's health experiences.

2. Health Examinations

Health examinations should be essentially educational in nature and not merely free medical or diagnostic service devoid of educational value. Here the child comes to see the limitations of his bodily mechanism and here he learns from a new angle the relationship between his health and his health practices. Here it is that the child should learn to appreciate scientific medicine and the service of the medical profession in such a way that he may be willing to make a wise use of medical service throughout adult life. If this one objective of the school health program were reached it would open the door to unlimited opportunities for health improvement through medical service.

3. Correction of Physical Defects

This activity is a continuation of the processes which began with the health examination, and the pupil's experience will definitely affect his willingness to

secure medical assistance in the future and his attitude toward physicians, clinics, hospitals, and care of his body.

4. Communicable Disease Control

The school is primarily concerned here with the prevention of disease, but the actual situations which arise in the school in connection with this activity provide better teaching opportunities than can be found in the theoretical discussion of disease, because they are related to actual experience.

5. Physical Education

The physical activities of children contribute to health directly but physical education also contributes to general education. It aims to train the body in posture and bodily mechanics; to establish a fondness for games, big muscle activity, and habits of regular exercise; to provide relaxation in the school day; to develop special skills; to correct marked defects of posture through work with individual children; and to contribute to personality, social adjustment, character, and mental health. Success in these activities serve as one measure of health, and the desire to succeed in physical accomplishment is an incentive to the development of health habits.

*6. The Maintenance of Hygienic
Conditions in the School Building*

The hygienic condition of the school plant tells the child whether the school authorities really believe in the principles of sanitation which they teach. It accustoms him to good or poor standards as the case may be. The cleanliness, ventilation, lighting, and seating, together with proper provision for supervision of toilets and bubbler fountains, contribute to the health education of the child.

7. School Lunch

The mid-morning lunch and the noon lunch, where the latter is taken at school, provide definite opportunities for health training in the selection of food and in the hygiene of eating.

8. *Hygienic Arrangement of the School Program*

More and more attention is being given to the effect upon the health of the pupil which is produced by the way in which the general school program is conducted. The type of instruction and the attitude of the teacher toward the pupil have definite effects upon his mental health. The length of the recitation period, the provision of brief periods of relaxation, the sequence of studies, the nature of discipline and punishment, the number of pupils in a room, the nature and conduct of examinations, the extent of extracurricular activities, and the wise selection of textbooks or source materials, all have an effect upon the health of the child and upon his standards of conduct.

A wider recognition of the nature and breadth of the school health education program will eventually lead to its proper supervision and to the coördination of the various activities from the viewpoint of health education.

THE HEALTH DEPARTMENT

The important health education program of the health department is not as uniform in its operation or as easy to describe as that of the school department. It is possible to indicate the health education responsibilities of the health department and the tools or agencies through which it may operate.

The responsibility of the health department for educational activities may be divided into four parts:

1. To keep the public informed concerning the work, the services and the needs of the health department in order to maintain the public support which a service agency of the government needs in a democracy.
2. To instruct special groups, such as food handlers or householders, and the public generally concerning those procedures involved in the prevention of the spread of communicable disease.
3. To promote hygienic living on the part of the general population through educational activities of various sorts.

4. To assist the health education program in schools by supplying health information concerning the city or county, and in helping to arrange field trips for older pupils to demonstrate the activities of the health department.

The health-education activities of health departments may be:

1. Through direct individual health instruction by employees, such as physicians, nurses, and sanitary inspectors, in the conduct of their duties.
2. Through providing or arranging for instruction of small organized classes in such subjects as home hygiene, the care of the sick, first aid or the care of children.
3. Through providing speakers by means of an organized speakers' bureau, operated in coöperation with the medical and allied professions.
4. Through newspaper publicity, involving news items, feature stories, and editorials.
5. Through the radio.
6. Through printed matter, including reports, bulletins, leaflets, pamphlets, handbills or form letters.
7. Through various types of visual instruction, including moving pictures, posters, demonstrations, exhibits.
8. Through the educational use of health surveys.
9. Through the direct instruction of food handlers yearly when each receives his card.

PRIVATE AGENCIES

The private agencies have essentially the same health education tools with which to work as does the health department. The personnel is varied but includes the medical staff of medical institutions, the nursing staff of medical and nursing organizations and health educators in medical institutions, tuberculosis associations, and social agencies, particularly those working with young people.

We cannot describe here the many varieties of national, state, and local agencies contributing to the public health. Their educational services lie mainly in two fields: (1) the promotion of new health activities and the development of public support for them; (2) the development of educational

activities in the field of special interests in order to secure more rapid advancement in this field than would otherwise be possible. These agencies develop support for the health department and the school health program. They often stimulate and make possible more effective health work on the part of the official agency.

We need, and we shall ultimately develop, standards and methods of measurement of the quantity and quality of health education activities. At present the school health program has made more progress in this direction than has the program of popular health instruction.

We have seen 3 different phases of

the problem of health education for the community, and we recognize that there are different technics involved in the 3 types of activity. How can the activities of the health department, the school department, and the private agencies be welded into a unified program of health education? It may be that there will eventually evolve some plan for the use of a specialist in health education who can serve all these different groups.

At present the most feasible development is, perhaps, the health education council in which all of these groups are represented and through which the various phases of the program may be interrelated.

Schick Reaction

IN a study of the relation of the Schick reaction to antitoxin titer,¹ 47 military recruits were tested with 2 dilutions of Schick toxin, one 1-600 and one 1-300. A second toxin was also used, dilution 1-500, and for all the dose given was 0.1 c.c. Estimations of blood antitoxin were made by Ehrlich's guinea pig method. Only those negative to 1-300 dilution had more than 1/30 unit antitoxin per c.c. in blood. Those negative to 1-600 and 1-500, yet positive to 1-300, had less than 1/30 unit, and often as low as 1/60 unit. A negative test with usual dilution does not correspond with 1/30 unit per c.c., the

amount generally considered requisite to give sure immunity.

In a later study² the authors have attempted to determine the effect of intercurrent infective diseases on the Schick reaction. In a study of 54 cases it was found that an attack of influenza may lower the immunity against diphtheria and the authors suggest this as an explanation of the severity of diphtheria when complicating influenza. According to a number of authors, measles has no effect in lowering the immunity against diphtheria.

1. *Bull. Hyg.*, 8:376, 1933.

2. *Bull. Hyg.*, 10:152, 1935.

Chlorination of Los Angeles Water Supply*

R. F. GOUDEY

Sanitary Engineer, Bureau of Water Works and Supply, Los Angeles, Calif.

LOS Angeles has the distinction of being one of the few cities having no sewage laden streams or lakes tributary to its water supply. Chlorination is practised entirely as a precautionary measure for protection from various but important seasonal factors. Particular problems are recreational use of remote watersheds, effective storage for distribution, contamination from seagulls and other birds, safeguarding of local gravity conduits, large and sudden variations in flow due to irrigation demands, and isolation of treatment plants because of great distances separating them. Special developments include automatic chlorination, intermittent treatment and a coördinated system of control.

The chief water supply of Los Angeles is from the Owens River Aqueduct, itself over 250 miles in length and which drains the east slope of the Sierra Nevada range from Mt. Whitney, the highest point in the United States, for a distance of 150 miles north to Mt. Lyle, which is farther north than San Francisco. The snow capped Sierra peaks and glacial laden crags at elevations of 9,000' to 14,000' constantly feed alpine streams with water of pristine purity.

In the Mono and Inyo National Forest during each summer season nearly a million hikers, campers, fishermen, and hunters use the watershed. The maximum recreational use has been facilitated by excellent highways leading to extensive mountain roads and trails, organizations of pack train outfits, and regular airplane transportation to 5 mountain landing fields. On its way to the desert are meadows, flats and valleys which likewise are used for recreational purposes. The average elevation of the desert floor at the foot of the mountains and above the intake is about 4,000'. The aqueduct not only collects the mountain streams but also springs which emerge at the base of mountains and the drainage from the valley floor. There is some grazing of cattle along the lower slopes of the mountains and there are 4 small towns on the valley floor widely separated. The resident population on the watershed is 1.8 persons per square mile.

As might be expected, bacteriological samples of the supply at the aqueduct intake showed the presence of slight contamination but only to the extent of 25 per cent of the samples with 3 or more tubes positive and 30 per cent of 10 c.c. portions positive. Since no sewers discharge into any of these streams it becomes apparent that very few large cities have supplies with as low a contamination.

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

The aqueduct collects the entire flow of the Owens River which formerly discharged into Owens Lake. It starts out as an unlined canal, changes to an open concrete channel, and enters Haiwee Reservoir 60 miles below the intake. Haiwee Reservoir is made up of 3 narrowly connected sub-reservoirs giving effective storage of 6 or more weeks, which apparently removes a large portion of the bacteria entering with the aqueduct. There is no resident population on the watershed nor is hunting or fishing allowed. It is a cold, bleak location in the winter and is scorching hot in the summer. Bacteriological analyses indicate that the supply at the outlet of Haiwee Reservoir meets U. S. Treasury Department Standards. In fact, during the past year there were no samples having 3 or more 10 c.c. tubes positive, and less than 2 per cent of the 10 c.c. portions were positive.

The aqueduct from Haiwee to Fairmont Reservoir, 140 miles downstream, is covered, with no opportunity for surface or other contamination to enter. Fairmont Reservoir, likewise located on the desert, has no resident population or recreational use. It is at elevation 3,000' and supplies power plants in San Francisquito Canyon which in turn discharges into Dry Canyon Reservoir, still outside the City of Los Angeles. There is no opportunity for contamination of the supply at Fairmont or Dry Canyon Reservoir except through birds.

The main aqueduct supply in Dry Canyon feeds Upper and Lower San Fernando Reservoirs. A portion, however, is diverted above Upper San Fernando Reservoir through the Maclay High Line to the northeast side of San Fernando Valley. This supply is continuously chlorinated with 2 automatically operated chlorinators treating flows varying from 6 to 60 second feet. It has water injector pumps in duplicate with a gas engine pump standby. The Maclay High Line is a

gravity conduit and chlorination is necessary to counteract any seepage which may enter it from local sources as well as to overcome contamination likely to enter at Dry Canyon and Fairmont Reservoirs. It is proposed in the future to install ammoniation equipment on this line to carry residual chlorination to its terminal reservoir.

Upper San Fernando Reservoir has a watershed of about 9.0 square miles with less than 0.3 persons per square mile. A railroad crosses the north side of it. This reservoir is subject to contamination following periods of heavy rainfall from surface run-off occurring on the average of about 2 weeks out of the entire year. Chlorination is admittedly important during such times. The supply from Upper San Fernando divides, one portion going directly to Lower San Fernando for delivery to the main portion of San Fernando Valley and the city proper, and the other through a high line on the northwest side of San Fernando Valley leading to Chatsworth Reservoir. Water is used directly out of this line and consequently is continuously chlorinated at the Chatsworth High Line station. A third chlorination station is located at the outlet of Lower San Fernando Reservoir.

GENERAL LAYOUT OF CHLORINATOR STATIONS

In all, the city has installed 15 chlorination stations, although the number now in operation is 8. It has had as many as 31 vacuum automatics in operation at one time. The Mechanical Engineering Division has worked up a schematic arrangement for varying degrees of automatic control from Venturi or Pitot tubes. Features of the Los Angeles practice include: (a) cranes for ton containers; (b) a drip pan under the ton containers in which water is circulated from the tray to collect moisture from the sides of the container, prevent it from running into the scale

pans, and provide the necessary latent heat for evaporation of chlorine at lower temperatures; (c) water injector to carry waste gas from cylinders into the sewer; (d) differential converters from Venturi control leads converting positive pressures into corresponding vacuums; (e) connections to water leg on gas orifice to vary chlorine feed; (f) gas regulation valves; (g) a direct low voltage system with necessary relays and switches to cut chlorinators in and out to keep in step with the flow to be treated; (h) water injector supply automatically operated and in duplicate with a gas engine driven pump for automatic emergency use; and (i) manifold chlorine application points.

CHATSWORTH HIGH LINE CHLORINATION STATION

The Chatsworth High Line station consists of four 300 lb. machines where the flow in a gravity conduit varies from 9 to 90 second feet. All the piping arrangements are overhead—black iron pipe is used for chlorine lines, and hard rubber pipe for solution lines. The chlorination solution is discharged into the gravity conduit at 3 points. In the second room of this station is located a device designed and constructed by the department which converts float elevations in the conduit to vacuum differentials which operate the chlorinators. Electrical equipment changing the number of chlorinators in operation and injector pumps is located in the same room. The injector pumps are in duplicate with a 3rd gasoline unit which operates either when the electricity goes off or the pressure in the injector water has decreased below an operating limit.

Water from the Chatsworth High Line discharges into Chatsworth Reservoir where the storage capacity is sufficient for over a year. This reservoir is fenced and although a chlorinator station is constructed at the outlet it has never been found necessary to use it.

SAN FERNANDO CHLORINATION STATION

The 2 main lines from Lower San Fernando Reservoir, 54" and 72" in diameter, respectively, are treated at 1 station. There are 8 machines with a chlorine capacity of 2,000 lb. per day. The combined flow in both lines is 329 second feet. This station was constructed in 1925 and is automatic. On the lower floor are the duplicate water injector pumps and a standby gasoline driven injector pump for the purpose of operating when the power is interrupted. This emergency unit has actually performed on a number of occasions during serious power interruptions. Converter equipment is located likewise in the basement. Storage in Lower San Fernando Reservoir amounts to 30 days or more and it is rare when the water needs to be treated. As a matter of precaution, however, it is operated continuously during the winter and 30 days following the last rain of the season. There is a saving of \$1,000 a month when chlorination is discontinued at this station, although this monetary consideration has no influence whatever on when the plant runs or is shut down.

AQUEDUCT CITY SUPPLY

The main supply for the city proper after leaving the chlorination station at Lower San Fernando is conveyed across San Fernando Valley to reservoirs on the mountains south of San Fernando Valley and north of the city proper. Stone Canyon Reservoir is the most westerly terminal reservoir. It has a storage capacity sufficient for over a year. No one lives on the watershed, and it still has the indigenous shrubbery on it. A chlorination station was located at the outlet but has not operated for 2 years because the water, even during storms, complies with the Treasury Department Standards.

A second terminal reservoir system is Upper Franklin and Lower Franklin Reservoirs. Upper Franklin Reservoir

is small, there being practically no storage, and although it is surrounded by a complete drainage system there are times during heavy run-offs when its capacity is exceeded. Lower Franklin Reservoir is adequately protected against surface water along the west margins and the drainage area above the reservoir. A chlorination station is located below this dam and is operated during the rainy season to take care of possible contamination which might enter the barren slopes on the east side of the reservoir.

A third terminal reservoir system for the aqueduct is in Upper and Lower Mulholland Reservoirs back of Hollywood. A chlorination station of the most recent design has been constructed to treat water from both reservoirs. It is a 2 story building, the upper floor being divided into 3 rooms. The first is for chlorine cylinders, scales, and the operator's desk. It is equipped with drip pans and blow-off lines. The second room contains the 5 fully automatically operated chlorinators, with flexibility of operation by any chlorinator to any of the 3 lines to be treated. The converters are located in this same room on the other side from the scale beams. In the third room are the duplicate injector pumps, electrical control devices for automatic operation, and the Venturi meters. In the basement are the Venturi tubes and the manifolds through which chlorine is applied at 9 different points from a hard rubber header into the water lines. The efficacy of this method for applying chlorine has also been proved at the Franklin Canyon chlorination station.

Intermittent operation of the chlorinator at Franklin and Mulholland Reservoirs, together with the discontinuance of chlorination at Stone Canyon, has proved satisfactory in that at all times the water as delivered to the consumer meets the Treasury Department Standards. Bacteriological sam-

ples for the past year of the aqueduct supply in the city proper indicate 1.95 per cent of the 10 c.c. tubes as positive, and 0.80 per cent of the samples show 3 or more tubes positive.

LOS ANGELES RIVER SYSTEM

One-fourth to one-third of the city's supply is still derived from the original source before the time of the aqueduct, consisting of wells and galleries in the Los Angeles River at the mouth of San Fernando Valley. One gallery has a $4\frac{1}{2}$ mile gravity conduit leading to Silver Lake Reservoir and $2\frac{1}{2}$ miles additional gravity conduit leading to Elysian Park Reservoir. The second gallery, known as Crystal Springs, has 4 miles of gravity line leading to Buena Vista Reservoir and an additional length of 2 miles to Bellevue Reservoir. In 1919 both galleries were equipped to take in surface water from the Los Angeles River. Chlorinators of a now obsolete type were installed at that time but in a very crude manner.

Chlorinators were later installed at the inlet of Bellevue and at the outlet of Silver Lake Reservoir. The gravity conduits for the most part follow hillside locations, but in other places pass through paved streets where sewers cross over or under. Bellevue, Silver Lake and Buena Vista Reservoir have now been protected against surface run-off and the conditions now on the Los Angeles River system are entirely different from those formerly existing. No surface water is taken and the raw water from both galleries is clear and safe. Manual chlorination equipment near the upper ends of both galleries was installed in 1930 but residual chlorine carried only 1,500' below. It was found that slight contamination was entering between the chlorinators and the terminal reservoirs. In 1933 the River Chlorination Station was converted into a full automatic ammoniation and chlorination plant with marked results.

The station is located where both lines come near together, one is automatically operated from Pitot tubes for both the chlorinator and the ammoniator, and the second is operated from vacuum differentials produced by a mechanism operated by a float in the gravity conduit. Residual chlorine is now carried to all the reservoirs served by these gravity lines. It has permitted the total discontinuance of chlorination at the Bellevue and Silver Lake Stations. Bacteriological analyses of the treated river supply show 0.69 per cent of the samples having 3 or more 10 c.c. tubes positive and 1.31 per cent of the 10 c.c. portions positive.

MISCELLANEOUS

The design of the buildings is an important feature. The first chlorination stations were merely shacks. The stations built since 1927 are permanent, substantial and artistic. Trucks with ton containers can drive back into the station and be unloaded with cranes. The older type of this station is typified by the abandoned station at Silver Lake.

In order to be able to treat reservoirs with chlorine a chlorine barge was constructed which could travel in 4 directions and diffuse chlorine solution as desired. This equipment is being tried out at Silver Lake about once a year in an effort to cope with algae which are not readily controlled by copper sulphate. It has not yet found a place in regular routine control.

The department maintains a portable chlorinator mounted on a trailer consisting of the following equipment: 1 vacuum-type chlorinator with full range of orifices, 10 h.p. gasoline engine, 30 gal. per min. pump, 220/440 volt motor, scales for chlorine cylinders, cooling facilities for chlorine tanks under high rates of chlorine withdrawal, a full line of hydrant pipe fittings, gages for water and gas pressures and gallons per minute pumped, and a series of hoods that are placed around the whole trailer while it is being hauled from place to place. This equipment has been successfully used in all emergency operations such as treating new mains when trenches have been flooded and emergency work during the Long Beach earthquake.

The department 2 years ago spent considerable time in testing out a residual chlorinator which automatically varies the flow according to the demand in the water as well as the varying flow. Considerable development needs to be done on such equipment but it is felt that the sooner it is perfected the safer and more reliable will chlorination be.

A special cabinet, consisting of orthotolidine standards using 100 c.c. matched Nessler tubes read against a blue light under white glazed glass of samples representative of 20 minutes contact between the time of chlorination and testing, enables the operator to get consistent results and vary the chlorine dose as required.

Discussion

S. M. DUNN

Bureau of Water Works and Supply, Los Angeles, Calif.

THE first practical installation of apparatus for the application of chlorine to domestic water in the United States seems to have been made about

1910. This was in the remote East and antedates the first installation on the Los Angeles system by approximately 5 years. This first installation on the

Los Angeles system was located on the Los Angeles River supply, and the equipment was of the dry gas feed type. As Mr. Goudey has mentioned, the installation was crudely made and the building was not elaborate, but it was of concrete construction, and owing to the newness of the process of chlorination and to the short period of development of the equipment, no large amount of money was spent on architectural embellishment. We must remember, however, that the site of this installation, which is now surrounded by a well kept park, was then covered by a wilderness of brush and could only be reached by several miles of damnably rough roads.

Owing to the lack of experience of the builders of the then existing chlorinating equipment—and the experience gained to date by some of the present builders does not seem to me to have been phenomenally productive of practical equipment—this early chlorinator soon developed a variety of ailments which the busy engineers of the department could not take time to diagnose or combat effectively. Consequently, this machine was replaced in 1920 by one of the pressure solution feed type, which was supplied with injector water from a gravity line and treated water in a gravity conduit.

In 1923 the first vacuum type machine was installed. This installation was made at the upper end of Lower Franklin Reservoir and the equipment was placed in a tile roofed concrete building of not entirely unpleasing appearance.

In 1925, 2 more machines of the pressure type were installed on the outlet from Silver Lake Reservoir. This reservoir was at that time an important storage unit, but was located in a rapidly growing district and was not then, as now, protected from surface contamination by barrier walls, fences, and adequate storm drains.

From that time on there has been

steady improvement, not only in the equipment available for installation but also in general elaboration of plant layout and in the buildings that have been provided by the department for housing the equipment. This improvement has synchronized quite closely with the general increase in understanding; not only here but in the water works field at large, of the importance of reliable chlorination as a safeguard to public health.

All of the later plants have been made fully automatic, not only to keep down labor expense but also on the theory that if chlorination is necessary at all every practical precaution should be taken to see that the application is continuous and accurate. As Mr. Goudey has stated, automatic control has been extended to include not only the chlorinators themselves but also the equipment for switching the machines and the pumps for supplying the injector water. However, it seems well to state that we are of the opinion that these latter elaborations are more fully justified than his statement that the equipment at Lower San Fernando had "actually operated" would seem to indicate. In fact, it has been found that at times of heavy rainfall, when the danger of surface run-off contamination is greatest, the gasoline engine driven injector water pumps are apt to operate because of failure of electric power. During the deluge of last New Year's Eve, the Maclay and Chatsworth Inlet plants, so equipped, were subjected to power outages of 140 minutes and 105 minutes duration, respectively, but there was no interruption in the application of chlorine.

Our experiments with the residual controller soon disclosed the necessity for more elaborate means for bringing about adequate distribution of the dose over the whole cross-section of the main at the application point, if the main exceeds 18" in diameter. The opera-

tion of this controller is based on the theory that the residual chlorine in samples taken from the main at a distance of 500' to 1,000' down stream from the plant can be used to initiate a sequence of control of the chlorinating equipment. At the plant where the experiments on this controller were made, either 2 or 3 application tubes were in use at one time, but it was found that with this small number the controller would shift almost continuously, when it was in working order, owing to the wide variation in the residual chlorine content of the water at the sample point. In fact, a series of samples taken in rapid succession with constant flow and dosage would show residuals running from zero to 0.5 p.p.m. A manifold connected to a total of 9 application tubes was then installed and it was found that the consistency of the residual readings was greatly improved with consequent improvement in the operation of the controller. The department now has on order another controller of this type, the design of which has been improved in a number of ways, with which we expect to get much more satisfactory results.

On the whole, our experience with chlorinating equipment seems to indicate that available equipment is not built in units of sufficient capacity and that the range of automatic control is much too limited. This latter deficiency makes necessary the installation of a multiplicity of units, and in some installations

where the flow varies over a wide range, the installation of auxiliary equipment to shift the load from one machine, or group of machines, to another. This added complication would be eliminated if the producers of chlorinating equipment would supply machines of larger capacity and greater range of automatic control.

This deficiency in capacity and range is well illustrated at the Chatsworth Inlet Plant, where it is not at all unusual for the flow to vary from 24 to 102 cu. ft. per second in one 24 hour period and the yearly range in flow is from 9 to 136 cu. ft. per second. To cover this range a total of 4 machines is required. The smallest of these has a maximum capacity of only 80 lb. of gas per day and can only treat flows up to 27 cu. ft. per second. The second machine has a capacity of 150 lb. and is used in the range from 27 to 56 cu. ft. per second. For the upper part of the flow range 2 machines with a capacity of 250 lb. each are used. A more ideal installation would seem to be one in which a single machine of sufficient range and capacity would be used to cover the entire range of flow with a duplicate unit for standby purposes. To produce such an ideal machine, however, an entirely new principle of operation will probably be necessary, but such a machine will no doubt follow the more general realization of the limitations of the equipment now available.

Individual Variations in Immunity*

HULDA E. THELANDER, M.D.

*Departments of Pediatrics and Communicable Diseases, Children's Hospital,
San Francisco, Calif.*

IN 1806 Thomas Jefferson paid the following tribute to Jenner: "Future nations will know by history the loathsome smallpox has existed and by you has been extirpated." Similar predictions have been made upon the discovery of protective immunization against other diseases. To date, however, our vital statistics still show deaths from smallpox, diphtheria, and typhoid fever. These smaller organisms, viruses, and bacteria, have not taken readily the path of the dinosaur to extinction.

Failure may be attributed to 3 main causes: (1) the high percentage of people who have not availed themselves of prophylaxis; (2) imperfections of the immunizing agents, and (3) individuals' failure to respond to immunization. This paper is concerned only with the third of these, namely the individual variations in immunity to disease.

The graded school system was designed originally to educate all children equally. It failed in part because children differ in ability to learn. Pediatricians compiled "age-height-weight" tables, but the combined efforts of mother, teacher, and doctor could not fit every child into its mould. It proved easier to suit the tables to the child.

A discussion then on differences in immunity should not be amiss.

Jenner recognized second attacks of smallpox. Authentic cases of second attacks of measles have been reported. In 1933 one of our medical students located 28 cases of adult pertussis most of whom had histories of previous whooping cough. With the aid of the cough plate the diagnosis is made more readily now than in the past. Patients who have recovered from diphtheria without treatment are not always immune to the disease. In poliomyelitis it has been found that individuals with severe paralysis may have less immune substance in the blood than normal adults or people with mild attacks of the disease.

Two procedures lend themselves readily to the study of individual differences in response to an immunizing agent, namely smallpox vaccination and diphtheria immunization.

In Peking, in 1927, 75 Westerners and 109 Chinese were vaccinated. This group could be observed carefully and histories of previous vaccinations readily obtained. There were a few unvaccinated people in the group and their takes, which were true primary takes, served as controls. It was found that 5 per cent of the Westerners had secondary takes indistinguishable from primary takes. The interval between takes varied from 1 to 20 years. Of this group, 9 gave a history of 2 takes, 2 of 3 takes, 1 of 4 takes, and 3 had

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 3, 1934.

scars from several takes. Others had reactions varying from typical immunity reactions to more marked vaccinoids. About 20 per cent showed degrees of poor immunity production.

Of the 109 Chinese vaccinated 9 per cent showed secondary takes equal to primary reactions, and 21 per cent showed poor immunity production. One of the Chinese with marked pocking had a typical take. Other individuals in the group of both foreigners and Chinese had never had anything but an immune reaction following an original primary take.

That these findings are significant has been demonstrated by Lennox¹ of the Peking Union Medical College. In his survey of the incidence of smallpox among missionaries in China he received reports on 111 cases with 28 deaths, and was able to get detailed reports from 30 families reporting 51 cases of smallpox. Fourteen of these were fatal and 37 recovered. One fatal case had been successfully vaccinated 3 weeks previous to his death. Of the 37 cases who recovered, 16 had been successfully vaccinated in the past; 4, more than 15 years previously; 3, from 5 to 15 years previously; 1, 4 years previously; and 3, 1 year previously. Twelve had been vaccinated once, 3 twice, and 1, 3 times. From his own figures and a review of the literature Lennox estimates that the chance of contracting smallpox after exposure is 18 in the unvaccinated to 1 in the vaccinated.

If we review our results in diphtheria immunization we will find a similar state.

New York observers found that approximately 88 per cent of adults in the city of New York were Schick negative without immunization. In rural New Jersey, on the other hand, only 29 per cent were Schick negative. For the past several years the medical and dental students at the University of California have been Schick tested and

have averaged about 30 per cent negative, showing a rural rather than an urban type of immunity. That they had an inherent capacity equal to the urban group was evinced when they were given very small doses of toxoid. Eighty-five per cent of the Schick positive group were Schick negative 6 months after 0.1 or 0.2 c.c. of toxoid in 2 or 3 injections at 2 weeks interval had been given. With very slight stimulation a figure resembling that in rural New Jersey was changed to a figure like that in suburban New York. Some of these positives were immunized by a repeat series, usually of larger doses. Everyone who has had experience with the immunization of adults, however, has found a certain percentage very resistant to immunization or readily reverting to the Schick positive state. It was interesting and surprising to find that these individuals, resistant to immunization, frequently gave a history of diphtheria in one or both parents. In one case both parents had had diphtheria. This girl was immunized but not Schick tested. She contracted diphtheria after a short service in the contagious unit. The Hirzfelds³ report a positive correlation between the Schick reaction of parents and children and their respective blood groups. It may be that this group with a deficient immune mechanism is the chief source of our present diphtheria cases. Lennox reports 3 members of one family contracting smallpox 15 months after successful vaccination.

In most instances a negative Schick test means at least 1/30 unit antitoxin per c.c. serum. The Kellogg test is used to determine immunity by testing for antitoxic content of the blood. Here again there is not a 100 per cent uniformity between the Schick and the Kellogg tests. Certain individuals with a negative Schick test will still have a Kellogg test of "not immune." At

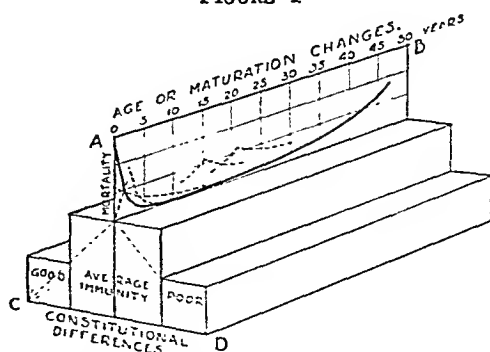
Children's Hospital the past 2 years we have done Schick and Kellogg tests before and after transfusions on the recipients and also tested the donors. When a Schick positive child was transfused from a Schick negative donor the usual result was that the recipient became Schick negative but *not* Kellogg "immune." In one instance the *donor* was Schick negative and Kellogg "not immune" and in this case the recipient's Schick state remained positive. In other instances as little as 4 c.c. of blood given intramuscularly from a Schick negative donor neutralized the Schick test of the recipient. One of these donors was tested for antitoxin content and found to have 5 units of antitoxin per c.c. of serum. This donor had never been immunized but had had repeated Schick tests. It is possible, therefore, for two individuals both having become Schick negative without immunization to vary in the antitoxic content of their serum from less than 1/30 antitoxin unit to at least as much as 5 units per c.c. This knowledge becomes significant when human serum is used for specific therapy. In the recent epidemic of poliomyelitis, Schick and Dick tests were done on patients receiving human and animal sera. In patients receiving human serum the Schick tests were negative except in 2 instances where a faint reaction occurred, whereas several receiving sheep serum had strongly positive Schick tests. There were practically an equal number of Dick positives in the two groups.

It is quite evident from the presented facts that individuals vary greatly in their immunity to disease, but, in addition to this, any given individual's immune state is also subject to change. An infant under 5 or 6 months does not usually contract measles, scarlet fever, or diphtheria; yet he is susceptible to smallpox, chicken pox, and pertussis. The erysipelas mortality in the newborn is extremely high; after infancy

he withstands the infection well, but as he ages he again succumbs to it. In some diseases like meningitis and tuberculosis mortality among adolescents is high. In practically all epidemics of poliomyelitis the mortality has been very high in young adults. On the other hand, time and age increase the resistance to a great many infections.

In addition to constitution and age, a third factor must be considered, namely, environment. In the rest of the animal world, the law of survival of the fittest rules. Civilization has interfered with this law. Sanitation, isolation, treatment of disease, and immunization affect the natural course of life. The most radical of these interferences probably is artificial immunization. One is justified therefore in raising the question, is there an optimum time for such interference? Vaccination against smallpox is generally advised between the ages of 6 months and 1 year or shortly thereafter, because reactions are less severe and undesirable sequelae less frequent. In a group of infants immunized with toxin-antitoxin a few years ago the best results were obtained when immunization was done between 10 and 15 months of age, both those done before and those done after this age showing a higher percentage of positives.²

FIGURE I



ILLUSTRATING VARIATIONS IN IMMUNITY
DUE TO CONSTITUTIONAL DIFFERENCES
AND MATURATION CHANGES.

In order to summarize or visualize this entire problem the diagram (Figure I) was made.

CD represents constitutional variations. These are shown as blocks rather than curves, for at present we do not know what type of curve individuals arranged according to immunity would take. A and B represent age or maturation changes. It is obvious that AB are averages for all groups. Whether or not curves plotted for C and D separately would be the same is unknown. Other questions arise such as: Is immunity separate and specific for each disease, or can an individual have good immunity to diphtheria and poor toward smallpox or poliomyelitis? If a person has poor immunity as a child, may he by the maturation process change to an individual with good immunity? or does the individual retain his original type throughout life and for all infections? Can the environmental factors alter the individual's immune mechanism? may fatigue, cold, and worry, alter it unfavorably or will diet

and vitamins improve it? How much does artificial immunization change the immune state?

Our ignorance of this subject is colossal and an attempt to study it appears futile. However, if we choose to make a careful study of the exceptional cases (both those long-lived and those showing very poor immunity) as to constitution, endocrinology, heredity, longevity, blood grouping, response to various diseases, and so on, we may be able to project the rest of the curve and thus get a better conception of the entire problem.

In the meantime, this crude representation may form the scaffolding to the structure into which we can gradually place our facts until the true picture is complete.

REFERENCES

1. Lennox, W. G. The Health of Missionary Families in China. *China M. J.*, 35:9-121 (Jan. supp.), 1921.
2. Thelander, H. E. Immunization against Diphtheria with Toxin-Anti-Toxin. *California and West. Med.*, Vol. 33, 1930.
3. Hirzfeld, H., and Hirzfeld, L. *Ztschr. f. Immunitätsforsch. u. exper. Therap.*, 54:81, 1928; *J. Immunol.*, 9:571, 1924.

What's a Committee?

THE ideal committee, of course, consists of three men. One must be the active chairman; one should be in Europe and the third in Timbuktu. The main idea is to keep the three far enough apart so that the chairman will be able to get the job done. There's

sense in the story about the small boy who asked his management engineer father: "Father, what's a committee?"

"A committee," answered father, "is a body that keeps minutes and wastes hours."—*Net Results*, May, 1935.

Tuberculosis Control in a Railway Health Insurance Program*

PHILIP KING BROWN, M.D., F.A.P.H.A.

Southern Pacific Hospital, San Francisco, Calif.

SINCE 1864 with the completion of the first part of the old Central Pacific Railroad, it was found necessary to provide accident and medical service to the employees of the road, because there were so few practising doctors in the state and almost no hospitals. A monthly deduction charge of \$.50 was required of all employees, and this served at that time to cover the expense of such care as the men received. The service was very largely surgical and continued so down to the time of the World War. The steady improvement in the type and extent of care given the patients, together with the better education of physicians generally, and the increased costs in methods of scientific investigation of disease, made this care of patients much more expensive, and the deduction has increased until now it is \$1.50 a month. There have been no medical conditions which were not treated in late years, in contrast to earlier years when exemptions were made where patients were found to be suffering from certain chronic conditions.

The present Chief Surgeon takes the very liberal and just ground that people have to work and that, since as high as 31 per cent were found to have correctable defects in the draft group, it was desirable that somebody should correct

these conditions before they make serious trouble, rather than take exemptions and have labor try constantly to "put it over" later in any way it could, under claim of industrial accident or disease. In the Company Hospital therefore, conditions are corrected as found. If the defects in an applicant are incapacitating they would prevent the man being employed at all, and there are certain things that have to remain entirely uncorrected like color blindness and deafness, for example. These men are not allowed to work where their defects would be a handicap.

For 22 years Wassermanns have been done on every patient admitted to the hospital, and under the present administration if lues is found it is treated. This is the most significant finding that results from routine examination because the percentage of employees who enter the hospital with positive Wassermanns has increased in 22 years from 3.2 per cent to 6 per cent. Next in importance, as a finding from routine examination, is tuberculosis, for in about half of the cases in which it is found it existed as an unrecognized incident, or if active, its true significance had not been appreciated.

The general examination on entrance to the Southern Pacific Hospital has been the means of uncovering a great deal of unrecognized disease, and has given us some very valuable means of prolonging life and usefulness, as well

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 5, 1934.

TABLE I

	Complications			Both Sides	Discharged from			Ages			Average No. of Employees	Per Cent Tuberculous
	Lung Tb.	Cavity	One Side		Pleurisy	Effusion	Empyema	Bronchiectasis	Sp. Co.	Hospital		
Executives, Officers and Assistants	14	4	2	0	1	1	1	2	3	1	1	3.4
Clerks, Stenographers, and other office Employees	128	26	9	3	20	4	0	6	40	5	18	1.73
Maintenance of Way (Section and B&B Workers), Signal men	168	57	16	2	26	6	3	9	62	24	21	1.5
Shops and Stores Commissary Dept.	145	34	13	0	16	2	2	6	44	20	22	1.18
Agents, Teleg. Oper., Dispatchers, Station Baggage-man, Freight Handlers, Police, Towerman	61	15	5	2	10	2	1	2	14	4	9	1.9
Dining Car, Cooks Barber, Porters	45	7	5	0	12	4	0	4	13	6	4	4.0
Floating (boat) Equipment	22	6	3	3	3	0	1	2	8	1	5	3.9
Crossing and Bridge Flagmen, Watchmen	21	4	0	1	5	0	0	1	2	3	4	4.3
Yardmasters, Yardmen, Hostlers, Ice Foremen, Icemen	42	11	6	1	6	2	0	6	11	2	5	11.7
Train and Enginemen	68	16	7	1	12	2	0	2	18	3	9	0.84
Hospital Employees	1	1	1	0	1	0	0	0	1	0	1	6.0
Nurses	6	1	1	0	0	0	0	0	0	0	3	7.0
Janitors and Car Cleaners	25	9	4	1	2	0	0	1	9	1	5	3.6
Total	746	191	71	14	114	22	8	37	225	70	105	45.268

There were 27,730 hospital admissions in 6½ years.

There were 868 tuberculosis entries, including reentries for recheck.

General incidence in hospital admissions 2.7.

There were 746 original entries in which diagnosis of tuberculosis was made
Average number of employees during period 45,268
Incidence of tuberculosis discovered among employees 1.62.

as uncovering certain facts of great medical interest. For example, the history will frequently show that a man has worked 10 years in quartz mines before coming into our employ, and then will follow 10 to 20 years of employment for the Southern Pacific Railroad without any breaking down of the lung from an original silicosis. It has given us something to ponder about in regard to diagnosis. In one case a miner of hard coal for 17 years, working underground all this time, was employed, without examination, to blast rock. Within 2 years of employment he entered the hospital with a far advanced pneumoconiosis and extreme fibrosis, with a cavity in one lung and a rapid heart, but without fever. No tubercle bacilli were found in his sputum. As cavity formation has been reported in uncomplicated pneumoconiosis, it was impossible to send a case of this kind to a tuberculosis sanatorium since it would probably lead to a definite liability on our part should he develop later tuberculosis, which is not impossible. Reference is made to this case because of the serious liability which might result if a careful history and thorough examination did not make the condition entirely clear.

We have never been unfortunate enough to have to submit any lung tuberculosis case to the Industrial Accident Commission, although one stenographer who was in the habit of closing a drawer with her knee developed a bone tuberculosis at the point of contact. Her history showed that she had had lung tuberculosis which had been thoroughly arrested before entering our service, and that it did not become active at the time the bone condition developed.

There are on record in California a number of very ridiculous instances in which referees of the Industrial Accident Commission awarded compensation for the acquiring of tuberculosis. One of the worst examples is the case of a

county hospital ambulance driver who had to wash his ambulance and occasionally conveyed a tuberculosis case in it. Just how he acquired the disease from his occupation as driver and washer is a little difficult to figure out.

I have divided the admissions to the Southern Pacific Hospital into 13 groups in an attempt to have each group represent about the same type of work. Table I gives a summary of the findings.

In the first place the incidence of the disease between ages 20 and 35, and 35 and 50, is almost the same—293 and 292, while in people of 50 years of age and over, it was found in 155. It is impossible to give exact numbers in each group, but the ratio is about 4:4:2. With increasing age men come in for more and more serious things, while in the younger group such conditions as tonsillitis, or removal of tonsils, sinusitis, and trivial accidents bring the number up to a point that makes it surprising that the incidence of tuberculosis is so low. It is certainly not that the condition is overlooked at the time they are employed, because the younger they are the more attention is paid to the history and physical condition when they are examined. It is unfortunate that emergencies have to be met occasionally by taking on 300 or 400 laborers, in which event no examination can be made. A washout, perhaps, demands such immediate attention that extra men are recruited at very short notice. With the large number of foreigners that sometimes have to be employed, it has been very obvious that these people are in some cases hoping to take advantage of the industrial benefits, and we have found such a group present a large number of complaints in a comparatively short time. It would be in the interest of industry if immigrants could be examined adequately when they enter this country. In all probability working conditions are better here than they are in the places from which they come, and

when an immigrant reaches adult life with negative X-ray findings, which could be obtained at port of entry for less than \$1 each, it is presumable that he is not apt to develop tuberculosis in later life under the improved living conditions. The vast majority of our foreign employees with tuberculosis can be shown presumably to have had the disease, or the initial infection before they entered this country. The significance of our proximity to Mexico is interesting in connection with this latter problem. The number of Mexicans in San Francisco, for example, is only a few thousand, whereas in Los Angeles the number has reached as high as 300,000. The State of New Mexico had till recently more Mexicans and their descendants than all other nationalities combined. Our Negro population in San Francisco, although growing rapidly, is under 6,000, while Los Angeles has more than 10 times this number.

The incidence of tuberculosis among 27,730 admissions, not counting the re-entrances, amounts to 746 or 2.7 per cent. When the total number employed is considered and not the hospital admissions, the incidence is 1.62 per cent. There were 142 readmissions of these cases, chiefly patients who had returned from the sanatorium at Tucson to this neighborhood and were reexamined as to fitness to return to work. It has been our policy, if they are not in a very thoroughly arrested state within the year that we give them care, to try to provide for them through the county tuberculosis hospitals in their home districts if they have no homes of their own.

It is a very significant fact that the incidence of tuberculosis is highest among the groups that are not examined before they are employed. We have been particularly struck with the fact that out of a group of 14 interns taken annually there is apt to be 1 who is found to be actively tuberculous and 2

or 3 whose childhood infection is suspiciously severe and threatening, and who during the year's work with us develop conditions that make it necessary to take chest plates and temperature records and deal with potentially incipient conditions. One has to ask himself if the number of interns who apply from eastern colleges may not wish to come to California on account of some known or suspicious condition, and whether it would not be wise to ask them to send X-rays of their chests rather than their photographs and certificates of good moral character. Nurses who are not examined have a fairly high incidence of the disease although they are not exposed to tuberculosis, especially in the hospital since we send our lung cases to Arizona as fast as they are diagnosed.

A rather surprising fact is the protection that good pay and intelligence are to men who are undoubtedly exposed to considerable dust when riding in either closed cars or on engines, or getting off at stations in all sorts of weather. A group of train and engineers, of whom there were 8,087, showed an incidence of 0.84 per cent. Only 3 of the 68 cases had far enough advanced tuberculosis to die from it eventually, although nearly 25 per cent had cavities when first examined. They represent the highest paid group of all employees except executives. In contrast to these men, the executives, officers, and assistants show an incidence of 3.14 per cent, while their clerks and stenographers and other office employees exposed possibly to less favorable office conditions, show an incidence of 1.76 per cent in a group of 7,382. Another entire group in the shops, stores, and commissary department, numbering 12,286, show an incidence of 1.18 per cent, while 10,598 outdoor workers in maintenance of way and bridge building show 1.5 per cent. In cooks, waiters, and porters, of whom there were over 1,000, all Negroes, the

incidence was 4 per cent. This is probably due to the fact that they are examined annually and an X-ray plate made of the chest of every one. The fact has been brought to light with sufficient emphasis to make it important that family contact with tuberculosis is responsible for the disease in a very high percentage of these cases. Part of the history taken in such cases should be the occurrence of any questionable condition in the family and the making of such a condition reportable to the company. It would be difficult to enforce this, but the wives of a number of our colored employees have been found, through the local social service departments, to have the disease. This fact has been uncovered in seeking to provide for our employees' families through social agencies while they are being cared for at the tuberculosis sanatorium, or when the home is investigated because of our desire to send a patient back for further care in his home after his year under our sanatorium service.

Dufault and Robinson¹ review the subject of tuberculosis among the members of the same family and also the literature, the curious fact being brought out by Turban, quoted by Baldwin in 1902, that 80 per cent of 55 families showed evidence that the disease originated in the corresponding lung of the consort of a patient with lung tuberculosis. In Baldwin's 65 families 166 individuals (70 per cent) had developed tuberculosis in the corresponding lung. In 28 with parental tuberculosis 78 per cent had children with homolateral disease. In 35 families with one or more tuberculous brothers 63 per cent had the disease homolaterally. Fishberg has observed the same condition in two-thirds of the cases in which several members of the family were affected. The danger of housing open cases in families where there are children has been appreciated for decades. In California, state aid for the minor children

is refused if the breadwinner with open tuberculosis remains at home.

Just how far it is the duty of industry to insist upon the examination of doubtful family cases is a question, but in the Southern Pacific Hospital we have extended the services of our own laboratory to test the blood for lues in the members of the family of every instance where our employee is known to have the disease. It is a piece of public health work that promises much for a proper system of health insurance made compulsory for low wage earners. We try to have local doctors or clinics examine the families, and we know that if state aid is applied for, the local welfare director will see to the examination of contacts.

Conjugal tuberculosis is a far more important matter than is appreciated and although the extent of it is still under discussion it is growingly shown that it must be considered seriously.

S. Tillisch from the Grepén² Sanatorium, Norway, shows that in 1,152 married patients 85, or 7.4 per cent, the consort had pulmonary tuberculosis. Among 841 patients with active tuberculosis her husband found 18.5 per cent had clinically demonstrable evidence of childhood tuberculosis. Harbitz concurs in this frequency. In 72 of her 85 cases there was no clinically demonstrable evidence of childhood infection, making the percentage 6.2, in which the consort of a tuberculous individual acquired the disease from this source.

S. Rowland,³ Tuberculosis Officer for Northampton, England, quotes E. Ward as showing of 156 cases (120 wives, and 36 husbands) 91, or 58 per cent, showed the consort to have tuberculosis, but considers the death rate of consorts more reliable. His figures show 1,242 certified tuberculous causes of death 1911-1920, of whom 525 were married, with only 15 instances where both partners were certified as having died of tuberculosis and one of these was

doubtful. Two and seven-tenths per cent represents his figures on accepted cases, while the general death rate from tuberculosis was 1.1 per cent in England and Wales.

The obvious criticism of these figures is that they should have included the deaths from tuberculosis in the 5 to 10 years preceding and subsequent to his elected 10 years of any conjugal connections of people dying of tuberculosis in that period, or it should have included the conjugal deaths in a longer period, so that the overlaps in the period before or after the 10 years selected, would represent a smaller percentage of the total possibility. Rowland's method does not admit of a long enough lapse in time between the deaths of husband and wife. With better methods of diagnosis the clinical determination of tuberculosis should be sufficiently dependable to cover the facts of the case.

M. Fishberg^{4, 5} states that he has never observed a case of lung tuberculosis transferred from one consort to another. He made an extensive study later, and reports examining 9 women consumptives and 161 men. In 3 per cent only were husband and wife tuberculous.

Weber⁶ reported 147 cases of tuberculosis acquired by consorts of 68 consumptives. This was before the discovery of the tubercle bacillus, and the method of contagion was not known. Nine tuberculous husbands lost 18 wives with the disease, 1 lost 4, 1 lost 3, 4 lost 2 and 3 lost 1 each. In the *British Medical Journal* (about 1888) is a report of 18 consumptive widowers of whom 11 per cent lost wives with consumption, and of 29 consumptive widows of whom 17 per cent lost husbands by the disease.

Brehmer, in 159 couples one of whom had tuberculosis, found 12 per cent of the consorts infected. Jacob and Pannwitz, in tuberculosis sanatoria in Germany, found 8.57 per cent of cases where tuberculosis existed in both of

married couples. Weinberg⁷ reports 8.3 per cent of husbands of tuberculous wives died from tuberculosis, whereas only 4.5 per cent of wives of tuberculous husbands died from it.

Minnig, before his study at the Denver Municipal Clinic, was prejudiced in favor of Fishberg's idea of the non-existence of conjugal tuberculosis but after a study of 1,000 cases he made the statement that an average of 8.7 per cent showed the disease in both partners, and added: "If we take the normal incidence to be 2.7 per cent among all classes we do not find anywhere in the literature so low a percentage in the consort of the infected husband or wife."

Crouch, of the Modern Woodman's Sanatorium at Colorado Springs, showed even more strikingly that the wives of tuberculous husbands acquired or died from the disease to the number of 6.4 per cent, while 58 per cent of widowers who had lost wives of the disease, acquired it.

An extraordinary variation continued throughout a long list of observations here and abroad. This brief review of the situation is given for the sake of bringing out the point that the great variation in opinion among investigators does require a certain standardization, if one would make comparisons, but the fact cannot be evaded that, while there exists a protective relative immunity in cases where mild exposure occurred in youth, the frequency of this immunity being overcome in the case of adult exposure must be recognized.

The frequency of tuberculosis in nurses has been called to attention many times. Shipman, University of California, has dwelt on it a number of times. Geer in Minnesota has written twice on the subject recently, and in his article in the *Archives of Internal Medicine*,⁸ January, 1932, shows that 5.5 per cent of 110 nurses who entered training were tuberculous within 2 years. He contrasts this with Ship-

man's 2.6 per cent in the University of California training school over a period of 6 years. Much, in the Eppendorf Hospital, found his percentage reaching from 1 per cent to 4.6 per cent after the war. Ross, in 800 cases in Manitoba, found 6 per cent had developed tuberculosis in a 4 year period. The average incidence in women of the same age is estimated at 1.5 per cent. Geer has also reported twice on the incidence of tuberculosis in the Aucker Hospital in St. Paul. His latest figures show an incidence of 4.5 per cent of tuberculous disease among nurses in the training school. In September 1928, he undertook to test all nursing school applicants with tuberculin and those that were negative were retested every 6 months—30 per cent were reactors on entering the training school, and nearly 100 per cent before the training was complete. In 5 other St. Paul hospitals the average percentage of reactors was 42 in the 3rd year of training, and no cases of tuberculous disease in the 2nd year period prior to this were discovered. Geer makes the important suggestions that all nurses employed in the hospitals, and all student nurses be given a tuberculin test and have a chest plate made. He recommends better supervision of the hygiene of all tuberculous patients that are admitted.

The hospital should be a school and far more attention should be paid to teaching patients, through both nurses and doctors, as to how to handle their infirmities. A great deal of attention is given to those phases of our responsibility in the Southern Pacific Hospital. Cases of a single classification are kept together so that patients may learn also from each other. As it is frequently necessary to keep lung cases for some weeks before they are sent to Arizona, it has become a custom to use this period for instruction, not only of the patients but also of the nurses who have the care of them.

The high incidence of the disease in crossing flag men and bridge watchmen of 5.1 per cent is due to the fact that these men are frequently employed when long past 45 years of age, and without examination. It represents also one of the mistakes in excluding any class from a thorough physical examination on employment.

The 42 cases diagnosed as having tuberculosis of the lungs in the General Hospital from among yard foremen and yardmen, hostlers, ice foremen, and icemen, represented 11 per cent of the total employed in those fields, the highest incidence of tuberculosis by far, and demanding an explanation. Accordingly those 42 histories were reviewed in detail, with the following facts brought to light. Most of the cases were from the Southwest. Only 4 were icemen and 2 of these were foremen with 10 and 25 years service. Neither was admitted for lung condition. One had an arrested or apparently cured condition, and the one employed 25 years had a definitely active process. The 2 icemen had been employed respectively 1 and 5 months. They both had had pleurisy before employment, and the one employed 5 months had a healed lesion of one apex. The other came in to have an old hernia operated on. It could not be determined that the occupation had anything to do in either of these cases with the pulmonary condition.

In taking over another railroad in the Southwest it was found that of approximately 40 to 50 clerks sent to San Francisco 20 per cent had had tuberculosis and were sent back to the Southwest to the climate and surroundings they had been used to. This is cited as further evidence of the frequency of arrested pulmonary tuberculosis in that region.

Among the 38 men who worked on or about the motor equipment at station yards, 9 were apparently healed old lesions, 18 were in an active stage and

recent, and 11 were chronic cases. Of the 18 acute cases, one was admitted with tuberculosis of lungs, kidney and bladder, 5 had productive cough, 2 were supposed to have influenza, 3 had had accidents, 1 a hernia, 5 complained of such things as neuralgia, sore throat, and run down state, and 1 was short of breath. It must be remembered that if there is anything not obvious about an employee's condition he is sent into the General Hospital. X-rays and sputum examinations in small towns are sometimes difficult to get. The Hospital rule to examine every man from head to foot, no matter what brings him into the Hospital, uncovers fully half of the tuberculosis cases, and it is quite noticeable that among employees in Southern California, Arizona, New Mexico, and Texas, we have many cases of healed tuberculosis besides the incident of silicosis without tuberculosis.

In connection with silicosis it is important to call attention to dust as a hazard in railroad work. Russell⁹ reports the investigation of:

The cement industry, representing calcium dust.

Silver polishing, representing metal dust.

The granite industry, representing silica dust.

The coal industry, representing carbon dust.

The cotton industry, representing vegetable dust.

Street sweeping, representing municipal dust.

The conclusion is drawn that silica alone is a matter of importance. In various industries where grinding is done this matter is borne out by extensive studies, but apparently it is the silica and not the metal dust that makes the trouble. A case is shown however, of a World War veteran with a process that looked so like miliary tuberculosis that it had to be studied with great care. The boy had been employed sweeping out plaster molding works, and it was only after we sent to Portland, Ore., to have his brother's chest X-rayed and found that he had precisely the same picture though to a

somewhat less extent, as he had not been so much exposed to the dust of the plaster works, that a presumptive diagnosis was possible.

SUMMARY AND CONCLUSIONS

1. The important point in this study is that no matter what people enter a hospital for, the chance for a complete examination is too important a matter to be overlooked, and in advising people about themselves all the facts that have entered into their health problems should be known.

2. Arrested cases of tuberculosis in industry present an economic problem that is very important and only the most intelligent of the arrested cases can be trusted to protect themselves by what they have learned while getting well.

3. The racial differences are shown in the incidence of the disease among Negroes.

4. The problem of tuberculosis in the Pacific Southwest was illustrated by the fact that when the Southern Pacific Railroad bought a rival road running through its territory 11 of the officials who had been transferred to San Francisco had to be provided for in their former environment because of conditions of their lungs which had brought them to the Southwest.

5. Finally, annual examinations in industry are of the utmost importance from an economic point of view for industry and employees.

REFERENCES

1. Dufault and Robinson. *Am. Rev. Tuberc.*, Jan. 1934.
2. Tillisch, S. Conjugal Tuberculosis. *Tubercie*, 1921, p. 256.
3. Rowland, S. Conjugal Tuberculosis. *Lancet*, Dec. 13, 1924, p. 1224.
4. Fishberg, M. *New York M. J.*, Dec., 1916, p. 1085.
5. Fishberg, M. Rarity of Conjugal Tuberculosis. *Am. J. Med. Sci.*, Mar., 1917.
6. Weber. *Trans. Clinic. Soc.* London, 1874, p. 144.
7. Weinberg. *Beitr. z. Klin. d. Tuberk.*, 1906, p. 365.
8. Geer. *Arch. Int. Med.*, Jan., 1932.
9. Russell. U. S. Public Health Survey. *J.A.M.A.*, Dec. 6, 1930, p. 1714.

An Automatic Liquid Dispenser

HENRY BUKOSKI

Michigan Department of Health, Lansing, Mich.

THE fact that accurate dispensing of large volumes of media in small amounts is a tedious and time consuming operation resulted in the designing of the dispensing apparatus shown in the drawing.

The dispenser is made from glass tubing and the siphoning action is self-explanatory. The volume of liquid that empties at one time depends on the height C, the width D, the diameter of the S-tube, and also on the frequency of emptying. The frequency of emptying is controlled by the constricted tube B which must fit loosely into the S-tube. A pipette tip serves well for this purpose. The frequency of emptying may be further controlled by a Hoffman clamp. The dispensing is intermittent; and the operator is able to manipulate a rack of tubes, moving the rack over to locate an empty tube under the dispensing arm while the S-tube is filling. Pinch cook A is used when it is desired to stop the dispensing, otherwise flow through B is continuous.

The apparatus can be used for dispensing serum or melted agar media as well as broth. We have also used it successfully in dispensing Loeffler's

medium, and for filling silver nitrate solution into wax ampules for prevention of ophthalmia neonatorum.

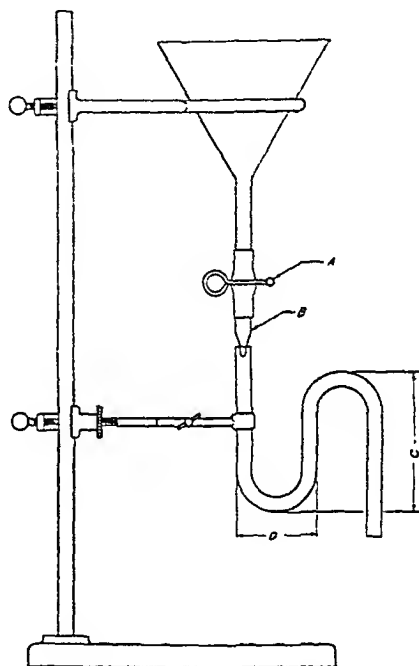


FIGURE I—Dispenser Apparatus

With a small amount of practice one will be able to more than double one's output using the old pinch cock method.

TABLE I
DIMENSIONS OF SOME DISPENSERS

<i>Inside Diameter of Tube</i>	<i>C</i>	<i>D</i>	<i>Volume of Each Discharge</i>
5.5 mm.	6.0 cm.	9.0 cm.	4.16 c.c.
5.5 mm.	8.6 cm.	9.3 cm.	5.8 c.c.
7.0 mm.	8.9 cm.	8.1 cm.	7.5 c.c.
5.5 mm.	16.6 cm.	11.2 cm.	10.2 c.c.
10.0 mm.	13.0 cm.	13.0 cm.	24.5 c.c.
3.5 mm.	1.6 cm.	1.4 cm.	0.4 c.c.

One hundred Loeffler's tubes were filled by each of the two methods in a test run. The time required when using the automatic dispenser was 3 minutes 16 seconds. When using the pinch cock method, 8 minutes 31 seconds were required. Another advantage in the use of the dispenser is the large saving in media, due to the fact that only the right amount of medium, and no more is dispensed into each tube or flask.

Table II shows the weights in grams of 16 consecutive discharges of water from one dispensing apparatus at the rate of one discharge per 2.6 seconds.

A modification of this apparatus has

TABLE II

<i>Weight in Grams</i>		<i>Weight in Grams</i>	
1.3515		1.3509	
1.3521		1.3558	
1.3520		1.3518	
1.3337		1.3591	
1.3643		1.3471	
1.3503		1.3497	
1.3298		1.3516	
1.3523		1.3417	
<i>Lowest</i>	<i>Highest</i>	<i>Maximum Difference</i>	<i>Average</i>
1.3298	1.3643	0.0345	1.3496

been designed for dispensing sterile solutions and will be reported on at a later date.

Chicago Study of Premature Births

THE Health Department of Chicago, Ill., made a study of the death certificates of infants born and dying in hospitals having more than 200 births a year, which shows that the death rate of premature infants under 15 days of age was as low as 5 per 1,000 births in

some institutions and as high as 50 per cent in others.

The Department of Health has established a 24 hour incubator ambulance service for hospitals without incubator facilities and for private physicians delivering mothers in the home.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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I GIVE AND BEQUEATH

THROUGHOUT the 64 years of the life of the American Public Health Association a Big Problem has existed. It exists today. It is set in capital letters and even in bold face in everyone's thinking. The Big Problem has faced every officer who ever served in any capacity in the Association. It has absorbed years of time of the governing bodies and eons of time of staff members. No one can say what discussions revolved around it in the earliest days of the Association's being, but it was probably then, as it is now, the *bête noir* of every Executive Board meeting.

The Big Problem is finance.

When the Association was organized in 1872, the membership dues were set at \$5.00 a year. They have never been increased. The grade of Fellowship was created in 1922 with annual dues of \$10.00, but the classification may be ignored in this discussion because it involves less than 20 per cent of the membership. Though dues remain at \$5.00 for the majority, services to members have greatly increased. The membership is not unaware of the fact that the total income from all classes of membership dues is only 25 per cent of the Association's budget. It is common knowledge, too, that the remaining 75 per cent is secured from grants and from the organization's business services and not through or from the membership.

The Big Problem reappears constantly because of the uncertainty attending gifts and because of fluctuations in general business which the Association's commercial activities faithfully and dishearteningly reflect.

Such a hand-to-mouth existence invites emergencies. After each has been weathered (do not ask us how) the necessity for a stable financial structure becomes more apparent.

An endowment fund that some day will yield sufficient income to cover the basic and essential expenses is the heritage those currently serving on the Executive

Board would like to leave their successors. By basic and essential expenses is meant the costs of maintaining an office, of supplying a magazine, certain other publications, and an Annual Meeting to members. It is generally recognized that an endowment fund for the A.P.H.A. probably never will be achieved through one or several large contributions. Instead, a slow building up process is indicated during which hundreds and even thousands of small gifts will be accumulated over a period of years.

We hasten to say at this point that our present purpose is not to ask readers to add from their small earnings to an endowment fund. If the urge to do so becomes intolerable, however, permit us to intimate that checks made payable to the American Public Health Association will be deposited in the proper account. Our chief intent is to give some background of the Association's financial difficulties, comment on the Big Problem, and point out its ultimate solution.

In preparation for the last mentioned, it should be noted that no one, in all the years of the Association's useful life, has ever made a bequest in its favor. This seems odd in retrospect because in past years there must have been fortunate citizens connected with and interested in the society who were in a position to will it something. Indeed, we have evidence that there were, in the reality of substantial cash contributions made by several individuals in days gone by. We have no way of knowing whether the Association figures in the wills of those of the donors who are still living. We do know that not one who has died remembered the society in his will.

It is not too much to hope that the A.P.H.A. may benefit by legacies in the future. After all, we are a body of professional people, the vast majority of us with jobs which have never paid us princely sums but which, on the other hand, have been sure, and have paid us greater or lesser salaries over a period of many years. Most of us own our homes, educate our children, eat and sleep somewhere ourselves with a fair degree of regularity and have a liberty bond or two tucked away against that inevitable day of retirement. There are without doubt a few among us blessed with a sense of acquisitiveness, or a flair for the sound investment, or fortunate enough to have been born with a silver spoon in our mouths, or to have had advantage of any of the thousand odd tricks of fate that result in making a few better off than others. These fortunate ones could even now provide a small legacy for the Association. That group also undoubtedly has well-to-do friends. Sometimes it is easier to persuade someone else to do something than to do it one's self. They could recommend the mention of the A.P.H.A. in a number of wills. Further, the poorest of us, our positions being what they are, know officially and very often socially people with much larger incomes than our own. Here again the worthy cause the A.P.H.A. represents can be dwelt upon as something to be considered in the ultimate disposal of worldly goods.

If we cannot give and bequeath, therefore, it may be entirely possible for ours to be the influence that induces someone else to do it, and the glory and credit in either situation is the same.

The solution to the Big Problem is not an out-and-out donation running into many figures which will provide insurance to time eternal against worry and the constant search for pay-dirt which goes on continuously in the Executive Board and in the headquarters office, but an endowment fund arrived at after a number of years through a slow process of education and persuasion. The secret of the strength of the Association lies in its struggle to overcome financial obstacles. Too much money too easily arrived at is the cause of "Nervous Prosperity," as one

old-time physician diagnosed a case, quite as surely in organizations as in individuals. No one wants to see the Association sitting in the lap of luxury with the enervating, devitalizing hazards that such a situation brings. A margin of financial safety broader than the Association enjoys now, however, is a consummation devoutly to be desired. In anticipation of that, let us scan our friends' and associates' resources, and our own as well, with a view to disposal of a small portion of them eventually to that end.

A hint to those who have it in their power to help—It is much easier to get money for a project than a program. The *American Journal of Public Health* is a project well worth supporting. It lacks the dramatic appeal that a wheel-chair for a crippled child, for example, possesses. It must be sold to the intelligence and not to the emotions, and that is the hardest kind of selling. However, someone might consider its 25th birthday, occurring this year, worth commemorating through a contribution to be spent on paper and printer's ink.

"I give and bequeath" are words that extend an individual's influence and personality beyond the moment when he shuffles off this mortal coil. They are capable of assuring a measure of immortality to the writer if they are wisely directed. Let us hope they may be written many times in favor of the A.P.H.A.

INTERNATIONAL BIOLOGICAL STANDARDS

IN 1926 the Health Committee of the League of Nations appointed a permanent commission for the study of international standards for biological preparations under the chairmanship of Dr. Th. Madsen, Director of the State Serum Institute of Denmark, Copenhagen. The work has been apportioned to well known institutions in various countries—Germany, Denmark, the United States, France, and Great Britain having taken part. In most cases the laboratories coöperating were national institutions. Conferences have been held, discussions carried on, and results compared. There are now 22 international standards, including 9 for antisera, old tuberculin, insulin, pituitary extract (posterior lobe), estrous hormones, 3 of the arsphenamine group, 4 vitamins, ouabain and digitalis.¹

The most recent information which has reached us² tells of the adoption of international standards for gas gangrene antitoxin (*vibrio septique*), gas gangrene antitoxin (*edematiens*), antipneumococcus serum, type I, antipneumococcus serum, type II, and staphylococcus antitoxin. The Commission has asked the State Serum Institute of Denmark to draw up a scheme for the determination of an international standard for antitetanus serum, so that we may confidently look for a standard for this product in the comparatively near future. The status of antidysentery serum, Shiga, is also somewhat unsettled and the Commission has asked that the documentary material on hand should be reëxamined. The question of antityphoid serum has been placed on the agenda of the next session of the Commission.

One of the controversial matters is streptococcus antitoxin. The American standard adopted by the federal government has been selected as a basis for study and the Hygienic Laboratory (National Institute of Health) has agreed to place at the disposal of the Health Organization of the League of Nations a sufficient quantity of the standard serum for study. Up to the time of this report no effective action has been taken toward the adoption of an international standard for this serum, action having been hindered by the patents granted in the United States and several other countries covering the production and testing of the

product. Even in countries such as the United States, where a legal standard serum and unit in terms thereof have been defined officially, the manufacturers are obliged to submit samples of each batch of serum to the patentees for an independent and possibly discordant indication of its value, in units defined by them. Under the circumstances the Commission decided it was useless to proceed with work looking to an agreement on a standard and unit for international work which might conflict with the authority exercised by the patentees. This decision and the reasons for it were reported to the Health Committee of the League of Nations.

Up to 1914 the most important standard was that for diphtheria antitoxin which was established by Ehrlich and kept at Frankfurt, Germany. After testing in several countries, the original unit was accepted for the international standard.

The Health Organization of the League of Nations has placed the responsibility for the care, storage, and distribution of the standards adopted upon the State Serum Institute of Denmark and the National Institute of Medical Research at Hampstead, England. The former is responsible for all the serum standards and that for old tuberculin, while the latter has charge of those for hormones, the vitamins, digitalis and ouabain. In general these two Institutes distribute the standards to national central laboratories selected by the League and from them are distributed to smaller laboratories and research workers. Where there is no national central institute the standards are supplied directly from Copenhagen or Hampstead.

The work has progressed most satisfactorily. It is under the most competent direction that the world affords so that one may have great confidence in the products issued by any laboratory under national control in any of the countries adhering to the League. For the United States the standards are distributed by the National Institute of Health of the Public Health Service, Washington, D. C.

REFERENCES

1. *Lancet*, Mar. 23, 1935, pp. 685-686.
2. *Quart. Bull. Health Organisation of the League of Nations*, Jan., 1935.

SIR GEORGE NEWMAN

NEWS comes to us from England¹ that Sir George Newman retired March 31, 1935, from the offices of Chief Medical Officer of both the Ministry of Health and of the Board of Education. In England, according to the testimony of *Public Health*, this will bring to an end an era in which the developments which have occurred in the field of public health are described as momentous. The influence of Sir George Newman on these developments has been enormous. It is only by and through him that the health machine, including as it does the school health service, the maternity and child welfare scheme, and the extensive general public health service, has moved so efficiently and smoothly. Indeed there is just reason to believe that but for him this machine would never have existed and would never have been perfected. His knowledge and ability as well as his organizing capacity were required and brought into action.

Since 1907 Sir George had served as Chief Medical Officer of the Board of Education. It will be remembered that the need shown by the great war led to the creation of a Ministry of Health and he was appointed Chief Medical Officer of that service. He made the position of Chief Medical Officer and filled it adequately in every way.

In America we know him not only as a master executive officer, but as the writer of essays which have had a far reaching influence. His annual report was a textbook and guide to us in this country, not only recounting the aims and accomplishments of the Ministry of Health of England during the year, but discussing in a masterly way many matters of general interest. England will miss him more keenly than we in this country can, but none the less, his retirement is a matter of great concern to us.

His successor is Dr. Arthur Salusbury MacNalty. The Deputy to the Chief Medical Officer is Dr. Thomas Carnwath. Both of these officers possess high capabilities, and with our congratulations we wish for them successful tenure of office.

REFERENCE

1. *Pub. Health*, Mar., 1935, pp. 197-198.
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MORE PUBLIC HEALTH AWARDS

IN the May *Journal* the winners for 1934 of the Health Conservation Contests, conducted by the Chamber of Commerce of the United States at Washington and the American Public Health Association, were announced.

Two additional special awards were offered, one for cities and the other for counties, in the form of free public health surveys. Announcement has just been made that for 1934 the award for cities goes to Louisville, Ky., and for counties to Spokane County, Wash. These awards are open to all participants in the Contests except the winning cities and counties. The awards are made on the basis of the claims presented indicating the need of such a survey, the readiness of the community to coöperate in the survey, and the assurance that serious efforts will be made to carry out reasonable suggestions for improvement. The Grading Committee had a difficult task in deciding the winners as 27 communities presented strong claims for this special award.

PUBLIC HEALTH EDUCATION *

Please Check Your Mailing Lists

—You who are sending house organs, news releases, radio talks, and other routine material for possible use in this department of the *Journal*: please *check your mailing lists* to see that your material actually is sent.

Mailing lists are perverse, and subject to unexplained and unanticipated changes and errors.

We have had assurances that material was being sent which never arrived, or which came for a time, and then never more.

Unless your mailing list carries the name of Evart G. Routzahn we do not hear from you. Then the address should be: 130 East 22d St., New York, N. Y.

A Coöperative County Program

—*Michigan Public Health*, Lansing (March, 1935), tells what a little organization plus some energy accomplished in one county.

As a result of the combined efforts of the Health Education Committee of the Washtenaw County Medical Society, the County Commissioner of Schools, the County Nurse, the Extension Division of the University of Michigan and a member of the Health Committee of the County Federation of Women's Clubs, 38 speakers gave 105 lectures in 93 rural communities to audiences totalling approximately 4,500.

Planning of the program was done by a committee made up of representatives of the interested organizations. The organization of the lecture schedule was carried on through the medium of personal visits to the 130 rural schools in the county. These visits were made by the County School Commissioner, or a member of the Health Education Committee

of the County Medical Society, or the Chairman of the Health Committee of the County Federation. The program was explained and offer of the lecture service was made to the local teacher and the members of the school board. If participation in the program was desired by the local school officials, formal request was made by them to the Chairman of the County Medical Society Committee, who, in turn, arranged the assignment of speakers.

A total of 38 lecturers participated in giving the talks. Most of them were physicians, one was a dentist, and the others were specialists in some phase of public health from the staff of the University of Michigan. They lived in Ann Arbor, Ypsilanti, Milan, Clinton and Dexter. In the assignment of speakers, effort was made to have the men talk in their own districts, and if possible on their own specialties.

One hundred and five lectures were given during the program, all of them to adult audiences and most of them in rural schools although some were given in connection with Grange Meetings, Farmers' Clubs, Parent-Teacher Associations and similar groups. In all, 93 schools participated, and the average attendance at the meetings reached the unusually high mark of 50.

A Doctor's "Plain Language"

Reported by Associated Press from Kansas City:

Transcript of proceedings in a damage suit today:

Lawyer—"Doctor, in popular language, please tell the jury the cause of the patient's death."

Doctor—"In plain language, he died of an oedema of the brain that followed a cerebral thrombosis or possibly embolism that followed. In turn, arteriosclerosis combined with the effects of gangrenous cystitis. . . ."

The Forbidden Topic—Dr. John L. Rice, speaking in New York City, said:

Two or three months ago, I was invited to speak before a Kiwanis Club in New York on what the taxpayers in that group get for their

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

money in the way of public health from the New York City Health Department. The talk was also being broadcast to the public.

I began by telling of the activities of the various bureaus. I think at the end of about the first 5 minutes I came to the matter of communicable diseases, which was followed with the venereal disease work. I no sooner referred to "venereal diseases" when I heard a commotion in the corner of the room; the kindly chairman had been whispered to and said, "You can't talk about venereal diseases." I hesitated for a moment and then went on, omitting further reference to venereal disease.

A friend of mine, who is the president of the Connecticut State Medical Society, wrote me a letter the following day, expressing his appreciation of the talk and his regret that I had been cut off from talking about venereal diseases on the radio. It seems to me that the proper use of the radio is one of the steps in the advancement of public health education upon this important group of communicable diseases.

A few nights ago, I was coming in from Queens and I had as driver of the car a man of 30 or 35, a pretty intelligent sort of person. On the way back, he asked, "Is it true that physicians cannot ethically treat cases of venereal diseases? Is there something in the state medical regulations which prohibits the ethical doctor from doing this or giving treatments for venereal diseases?"

Those are two experiences which make me think we still have a long way to go in getting this information over to the public.

Health Education at Saranac—On June 21-22, 1935, preceding the National Tuberculosis Assn. convention, a "post-graduate study on health education" will be held at Saranac Lake, N. Y. Sponsored by Conference of Tuberculosis Secretaries; subject, "Putting our knowledge to work"; sessions on "What are we trying to do?" (program for combating tuberculosis); "What shall be taught?" (content); "How shall we teach?" (method).

"Can You Smell the Elephant?"—This is the title of an 8 page folder issued by Michigan Tuberculosis Association, 535 S. Capitol Ave., Lansing.

Johnnie, who had recently been to a circus, went to visit the school where his sister teaches. That day they were presenting for entertainment, a mock menagerie. As Johnnie walked in the door, he said to his mother, "Ooh, hurry, they've started! I can smell the elephant."

Of course, there really wasn't an elephant, but you couldn't blame Johnnie for thinking so, his sister decided after she walked outside and in again. The air in the schoolroom didn't at all make one think of the outdoors.

So she decided to do something. She appointed a committee of pupils to help.

Every day at 10:00 and 11:30 in the morning, at noon, and at 1:30 and 3:00 in the afternoon, the committee walked outside and back into the room. When they came in, they:

*Tried to Smell the Elephant,
Recorded the Temperature,
Looked at the Waterpan*

Then follows an account of home-made devices by which that school controlled heat, air, and moisture. Every step is illustrated by line cuts.

Health Education in Tennessee—The recently issued report for 1931-1933 of Tennessee Department of Public Health includes 10 pages on health education, and 4 full-page illustrations.

Public health education activities are necessarily a definite part of every activity of a public health program. Public health education is the foundation of all public health work. It is the fundamental principle guiding the whole program. Through the local full-time units more health education is extended to the people on account of trained public health workers making day-by-day contact with individuals than in any other way. Quite naturally this scheme of educating the people is of prime importance.

The Department has engaged in public health education in all the work, but more directly through the activities (which are presented in some detail).

School Health Program—The report says:

The school is the strategic place in which to establish a health education program. If it is carried on systematically, it reaches the entire population during the impressionable learning period, when habits and attitudes are being formed. The child's health pro-

gram functions 24 hours a day, and unless a positive, constructive program is encouraged, wrong habits, attitudes, and information are sure to be acquired.

Five pages are given to this subject, with particular attention to the Blue Ribbon Program in the schools. Elementary pupils who meet the blue ribbon requirements receive a small bar pin mounted on blue ribbon.

The requirements for the blue ribbon include average scholarship, behavior and health habits; the correction of remediable defects, and immunization against typhoid fever, diphtheria, and smallpox. The teacher determines the pupil's fitness for the ribbon in scholarship, behavior, and health habits.

The practice of sound health habits year after year will help to develop a sane attitude toward health as a normal quality of living rather than a subject to be taught. The habits stressed are those of adequate sleep, fresh air, exercise, cleanliness (internal and external), and the eating of protective and building foods. Nutrition is stressed because it is one of the serious problems of the child in the rural community.

The correction of defects has been made possible by the enthusiastic support of the elementary teachers, school principals, and county superintendents, and the intelligent coöperation of such individuals and groups as the local physicians, dentists, and specialists, the parent-teacher associations, women's clubs, Legion, auxiliaries, community clubs, Legion posts, men's luncheon and civic clubs, church organizations, local press and others. In some communities, clinics for correction of defects are held annually and are carried on by the pooling of all available community resources of supplies and personnel.

In a number of counties the Blue Ribbon Program culminates in a county-wide observance of Blue Ribbon or Child Health Day. The children who have qualified take part in a short parade, pageant, field day, or have some other form of recognition. Sometimes they are guests at a moving picture or meet at some public building for the awarding of school prizes. No prizes are given to individual children and the awards to schools are based on the number of blue ribbons in proportion to average daily attendance. Anybody who has seen these hundreds of children from the elementary schools, massed under their school banners, with bands and flags adding to this picture of life and color, realizes that in this pro-

gram of child health and protection, peace has its victories no less than war.

The increased interest and coöperation year after year on the part of children, teachers, parents, and communities, is sufficient proof of the soundness and value of this program.

The number of blue ribbons awarded in 1930 was 7,848; in 1931, 17,704; in 1932, 30,771; and in 1933, despite the depression and lack of funds for securing corrections, there were 38,887 boys and girls in Tennessee's Blue Ribbon army.

Here is what the associate in school health education has been doing.

. . . has written numerous articles, made radio talks, spoken at 5 national, 10 state and 23 district meetings of different organizations, met 105 local clubs and 115 parent-teacher associations interested in public health, appeared before 18 county teachers' associations, talked to the pupils of 468 schools, made 73 visits to 50 counties in Tennessee, and served as Secretary of the Tennessee Conference on Child Health and Protection.

Radio Talks—Active coöperation with local stations in giving talks on popular health topics.

News Releases which have included Special articles released for local newspapers, radio talks, school teachers, doctors, health workers, and others.

Health News—including the monthly *Health Briefs* with about 2,000 circulation, and a bi-weekly *News-Letter*, sent to all full-time health workers in the state.

News letters, leaflets, and publications from other state health departments have been collected and excerpts have been mailed to full-time local workers for their use in educating the public. Through this medium valuable information has been passed on to the local full-time workers. The health officers in the State receive weekly from the U. S. Public Health Service reports which contain valuable scientific information for health workers.

Literature—which includes a supply of pamphlets furnished on request to individuals.

Exhibits—Includes display material

. . . used by the Department for community fairs, public lectures, and have been furnished to school authorities and others who are interested in developing exhibits. Much interest has been manifested in the full-time health departments in preparing exhibits for community fairs. Posters and charts demonstrating the value of sanitation, typhoid inoculations, smallpox vaccinations, toxin-antitoxin or toxoid administration, and other activities have been furnished local health and school agencies.

Lectures and Conferences are given by State Department and county unit staff members

. . . to county medical societies, county courts, parent-teacher associations, federated clubs, civic clubs, school boards, city councils and others interested in promoting an educational program throughout the state. Through lectures, exhibits, newspaper articles, the public has been informed of the advantages of full-time county health work, the value of the State Department of Public Health and its divisions, and a general well rounded program in child hygiene, maternity and infancy, sanitation, and other activities.

Films as well as lantern slides are used.

Annual Conferences of full-time local health workers are held.

Professional Technical Education includes an introductory course at Vanderbilt School of Medicine to graduates in medicine who are interested in becoming full-time health workers.

Courses in public health nursing are given at Peabody and Vanderbilt, and a course for sanitary officers at University of Tennessee.

Would our readers like to read similar reviews of state department activities as they can be gleaned from annual reports? One difficulty would be that we do not receive many such reports.

Health Education Specialists in State Departments—The March 1, 1935, issue of *Public Health Reports*, U. S. Public Health Service, Washington, carries the annual "Directory of State and Insular Health Authorities."

Here we find listed the following full-time workers:

Connecticut bureau of public-health instruction: Elizabeth C. Nickerson, C.P.H.

Illinois division of public-health instruction: Baxter K. Richardson, chief.

Indiana bureau of health education: Bynum Legg, director.

Iowa division of child health and health education: Joseph H. Kinnaman, M.D.

Kansas division of public-health education: Earle G. Brown, M.D.

Kentucky bureau of public health education: John W. Kelly, director.

Maryland committee on public health education: Gertrude B. Knipp, secretary.

Michigan bureau of education: Marjorie Delevan, director; Pearl Turner, assistant director; Melita Hutzel, lecturer.

New Jersey bureau of public health education: Edwin C. Lanigan, chief.

New York division of public health education: B. R. Rickards, director.

Ohio bureau of publicity: Paul Mason, chief.

Pennsylvania division of public health education: J. C. Funk, LL.B.

Philippine publicity section: Jose P. Bantug, Ph.G., M.D., chief.

Texas bureau of public health education: L. E. Bracy.

Wisconsin bureau of education: John Culnan, director.

Fifteen departments and 17 individuals. Is it possible that all the individuals were not listed in the reports to the U.S.P.H.S.?

How about a luncheon or dinner gathering at Milwaukee in October?

Humor as a Teaching Device—Health speakers do use "funny stories." Have we studied the elements which make them an effective tool? All too often the stories merely precede a prosaic presentation of solid fact.

Since the health speaker should be a teacher we offer several paragraphs from "The Use of Humor as a Teaching Device," from *High Points* issued for high school teachers by the New York City Board of Education (March, 1935).

That humor may be used as a valuable teaching device is unquestioned. What is

questioned is not the utility of humor in the classroom but the type and quantity which should be used. Other teaching devices, from the stereopticon to the thought question in Latin courses, have received careful study and close analysis, but no such studies or analyses have been made of humor as a teaching device. In this field all has been left to the individual teacher, abandoning the pupil to his uninstructed judgment.

There is a crying need for a detailed study of the use of humor in the classroom. This article lays no claim to being that study, but merely attempts to raise the question and to call to the individual teacher's attention the necessity of a critical analysis of his employment of humor, with a view toward its revaluation in the interests of more effective teaching and of a happier student-teacher relationship.

Those who have thought about the matter agree that relevancy ought to be the *sine qua non* of humor as a teaching device. The difference between the teacher who skilfully uses humor as a pedagogical aid and the one who merely blunders haphazardly into a joke is largely a difference in their relative will-powers and abilities to resist temptation. The one uses humor as an adjunct to teaching, the other as a substitute for it.

None of the examples quoted by the author happen to touch health topics.

State Health Releases—Below are listed the titles of recent releases to newspapers from several state health departments. To these should be added the radio talks from Illinois and Connecticut, and the releases based on the weekly bulletin of New York State Department. *Probably other state departments issue similar releases.*

Iowa: A great objective (May Day in Iowa); Lending nature a helping hand (measles); Rural health service; Deaths from measles prevented; The laboratory in disease prevention; The attack on Germs; Explains how to "K.O." epidemics; Mottled enamel; Getting at germs; Defenses against disease; Odds against plural birth; Errors of Omission (birth registration).

Maryland: Goals (reducing infant mortality); A message to you (typhoid inoculation); Milk-improved production and increased consumption; Maryland's 500,000 (population under 16 years).

New Mexico: Accidents; From pig to man

(diseases); Bone eaters (primitive racial diet wisdom); Waste (in curing sickness); The precarious age (high school age); The Gosling (goose vs. gander as to coffee and tobacco); We drink (alcohol beverages).

Exhibits in High Schools—A Latin Exhibit at George Washington High School, New York City, was made up of models, drawings, maps, posters, book reports and scrap books.

One exhibit, as described in *High Points* published by New York City Board of Education,

. . . that was particularly instructive was a table set with delicacies to tempt the jaded appetite of a Roman gourmet—honey, wine, nuts, oysters, olive oil, garlic, beef, pork, cheese, milk, eggs, and grapes. The pie-shaped bread on the table was not a relic of Herculaneum, but had been baked by the student responsible for this table. The Latin names of all the foodstuffs on display were shown on cards. A chart which compared food prices during the Empire with present day prices aroused considerable interest and comment.

This description suggests the participation of pupils in all courses in a health and hygiene display.

In the annual Children's Fair held recently at the American Museum of Natural History there were a few health and nutrition displays among a wide range of almost remarkable exhibits. Probably the teachers lacked graphic ideas on health to share with the children. Many three-dimension displays would be possible. It seems likely that the pupils in the social sciences would be interested in picturesque and original methods for depicting statistics and ideas in the health field.

"The Fire Next Door" (fire prevention play for junior high school students), and a radio interview (by Boy Scouts and local fire chief). *Safeguarding America against Fire*, 85 John St., New York, N. Y. Nov. 2, 1934. *Free.*

"How Good a Driver Are You?" is

a highway safety test form issued by Travelers Insurance Co., Hartford, Conn. Six pictures indicate right and wrong methods of driving and walking, the correct ones to be marked "R," 6 pictures show dangerous practices, the reader to indicate whether the driver or pedestrian is at fault; a series of "yes" or "no" questions; a series of factual statements, each in one correct and two incorrect forms.

"How Safely Do You Drive and Walk?" is a 12 page folder with accompanying answer sheet. In 10 cartoons dangerous practices are illustrated with numbered descriptions for the reader to locate. Questions to be checked "yes" or "no" and "How Not to Stay Alive" and "Things Worth Remembering" complete the folder which is distributed by Travelers Insurance Co., Hartford, Conn.

"How Safe Is Home?" by Howard W. Green. A 48 page study of accidents in Cleveland, including maps, diagrams, and tables. Published by Cleveland Health Council, 1900 Euclid Ave., Cleveland, Ohio. 50 cents. Some of the data may be quotable, but it is to be hoped that other cities may duplicate the type of study here illustrated.

We Do Not Cover the Field—Too much is going on; too many people are doing good work; and too few people take the time to help us here to share their successes or failures with health education workers generally. We can report or discuss only what is sent to us.

And frequently essential information is lacking about material sent so that no use can be made of it.

EDUCATION AND REFERENCE

"America's Standing Army for Health Defense" (health, medical and other professional groups); "The Final Drive in the Campaign against Tuberculosis"; "Twins and Their Sur-

vival"; "Automobile Fatalities Decline among Children: Increase among Adults." *Statistical Bulletin*, Metropolitan Life Insurance Co., New York, N. Y. March, 1935. *Free*.

"Can't Afford the Eight-Hour Day?" provides data for local efforts to change the time schedule for private-duty nurses. *Am. Journal of Nursing*, 50 W. 50th St., New York, N. Y. May, 1935. 35 cents.

"Diphtheria Can Be Eliminated: Immunize the Babies," says Dr. W. H. Park under that heading in *Child Health Bulletin*, Am. Child Health Assn., 50 W. 50th St., New York, N. Y. May, 1935. *Child Health Bulletin*, regularly to members; single specimen copy 10 cents.

"Insects," a list of available publications on insects injurious to man, etc. Supt. of Documents, Washington, D. C. *Free*.

"Report of Progress"—does not look like a report—is a 4 page illustrated folder—several ideas on copy and illustrations. Copy for 5 cents. Committee on 8 Hours for Nurses, 132 E. 45th St., New York, N. Y. Also, "Dr. X Knows Why 8 hours are better than 12"—envelope enclosure—example of "first person statement or testimonial." Copy for 3 cents. Both good for local campaigns.

A "special contraception number" of *American Medicine*, 60 E. 42d St., New York, N. Y. (March, 1935), includes editorials, original articles, and book reviews. Both sides are given a hearing. 25 cents.

Two maps showing the relative rank of the 48 states as to maternal and infant mortality, are offered for exhibit purposes. Address Children's Bureau, Washington, D. C.

"Vegetables in the Diet," by S. L. Smith. The third of a series, this article reviews changed attitudes, and proposes novel promotion methods to utilize the new points of view. Ideas

for exhibits, and for those who seek to enlist the aid of fruit markets, roadside stands, and even the catalogues of seed-men. Paragraphs on needed research will warn writers and speakers against too broad generalizations. *Journal of Home Economics*, 101 E. 20th St., Baltimore, Md., April, 1935. 30 cents.

WHAT OTHERS HAVE DONE

Some of these "ideas" may be adopted or adapted to your own work.

Again *Journal and Sentinel*, Winston-Salem, N. C., in coöperation with City Health Officer Carlton, issued a "Child Health Section," a 16 page tabloid magazine. There are numerous specially written articles by national health authorities. Sample for 2 cent stamp to City Health Dept.

And, too, the *Spectator*, Hamilton, Ontario, has made an annual event of its special health edition, presented in coöperation with the Medical Officer of Health.

In display type the following statement occupies the last page of May, 1935, issue of *Health Bulletin*, North Carolina State Board of Health:

This space is
sorrowfully dedicated
to the memory
of the
6,072

North Carolina Babies
who died during 1934 before
they were one year old

*A Disgraceful Sacrifice of
Infant Life for Which the State
Has No Legitimate Alibi*

Once upon a time a speaker's assigned topic was "Mental Hygiene," but he had it changed to "Inside of Your Head." Which do you prefer, and why?

"The Parson and the Doctor Discuss Leprosy" is an example of conversational copy in health education, one of

several types used in *Jamaica Public Health*, Bureau of Health Education, Kingston. March, 1935.

The recent publication of a "twenty-fifth anniversary edition" of Clifford Beers's *A Mind That Found Itself* resulted in numerous extended book reviews which did an effective job in mental health education.

Some of the community fund or chest posters or placards on health services are particularly well done and supplement the publicity of individual agencies. A recent one on "Healthy Babies" comes from Denver Community Chest.

What is it? Why is it dangerous? What causes it? These and other questions with their answers are found in a 4 page folder on tuberculosis issued by Bellevue-Yorkville Health Center, 325 E. 38th St., New York, N. Y. Is it not possible that the question and answer form might be used every once in a while to give a fresh approach to old material?

"What is Wrong with This? A case report with at least 3 things wrong in its handling!" *Public Health Nursing*, 50 W. 50th St., New York, N. Y. May, 1935. 35 cents. An idea for professional journals and staff conferences. In modified form it seems to offer a method of getting attention to home and community health problems. There is in it a possible newspaper competition.

RADIO

To repeat, the editor of this department earnestly requests full information about mention of venereal diseases in broadcasts.

From the Public Health Committee of the Cup and Container Institute, 30 Rockefeller Plaza, New York, comes a request for copies of radio talks on the sanitary dispensing of food and drinks.

Under this general heading we include talks on tavern and soda fountain sanitation, the

common drinking cup, roadside stand sanitation, and any other aspects of the spread of respiratory diseases through the channels of food and drink dispensing.

When the material has been assembled, we shall be very happy to make copies of the whole set available to you if you should care to have them.

Radio addresses by the Governor General, the Prime Minister, and the Leader of the Opposition, inaugurated the King George V Silver Jubilee Cancer Fund in Canada. The addresses are reported in *National Health Review*, Dept. of Pensions and National Health, Ottawa. April, 1935.

As announced in *Everybody's Health*, St. Paul, Minn.:

With his first broadcast in April this year, Dr. W. A. O'Brien of the University of Minnesota, began his seventh consecutive year delivering weekly health talks over the air under the auspices of the Minnesota State Medical Association. He gave the first in the series April 4, 1928. During these years, the program has become one of the most popular sustaining programs of WCCO, attested to by the ever increasing number of letters received from the radio audience. Requests for a booklet offered at only one broadcast last fall reached over 2,400, believed to be an all time station record for a morning program.

Extracts from the talks by Dr. O'Brien appear in the monthly issues of *Everybody's Health*. The May topics:

Hay fever. Anemia in children. Peptic ulcer. The sixth year molar.

American Medical Assn. (N.B.C., Tuesday, 5 P.M. EDST, or C.B.S., Thursday, 4:30 P.M. CDST):

Sickness insurance. Sudden death. Child health. "Catarrh." May Day or all year 'round? Mothers of America. Training good doctors. Pain. Being your age. Saving our mothers. Children's eyes. Saving our eyesight. Eye accident prevention.

Hartford Tuberculosis and Public Health Society:

Classroom education for healthful living. Work at the Hartford Dispensary. Knowl-

edge alone is not the way to health. Social Service at the Municipal Hospital. A day with the visiting nurse. Guarding the health of 2,300 children. The place of the Y.W.C.A. in the health program of the community. The medical social worker in a hospital. Work of the Juvenile Courts in crime prevention. The health program of the Y.M.C.A. The importance of health in family welfare. The family and home as the unit of community health. Modern weapons in fighting tuberculosis. Mental hygiene.

New York City Dept. of Health, 139 Centre St. ("enclose stamps for postage"):

Quacks and weight reducing. Quacks and tuberculosis. Recreation for every member of the family. Winter babies. Home care of invalids. The shortest day and cod liver oil. Milk gets a boost. Quackery in diabetes. When every cent counts. I am a fanatic about this (covering of coughs and sneezes). "The eyes have it." The autumn of life. Is there a school child in your home? Not everyone wants to reduce. Feeding the family. Food sanitation. The story of diphtheria immunization. The war on mosquitoes. They call them accidents. Common sense and ventilation. Fads and fancies in medicine. What about cancer? Pneumonia. Meet the facts on meat. Hear ye! Hear ye (care of the ears). Measles-time. The six year molars. Speaking of vitamins.

Ohio State Dept. of Health (station WOSU at 10:15 A.M., Thursdays):

Child health as reflected in vital statistics. Child Health Day as a factor in child life. Hospital Day in its relation to child health. Rabies. Occupational diseases.

REPORTING

A miniature line cut, a concise caption, and a date in red. Then another, and another, and more of them irregularly arranged over the two outside cover pages of a report and a flap the size of one page. At the top of the flap which folds back over the front cover page we read: "Meeting Human Needs: 39 Years of Palama Settlement." That reveals the secret. The 3 cover pages tell the story of 39 years; inside is the record of the "39th

Year of Service." The first inside cover page: "Where the Money Came From" and "Where the Money Went," the financial statement. Nearly every page has a hand-lettered script heading printed in red. Again Palama Settlement has done something "different" and decidedly effective. The Settlement is in Honolulu although the report does not say so. Of the \$197,829.97 budget \$30,000 went to recreation, \$53,000 to medical and \$46,000 to nursing services, \$2,300 to diphtheria campaign, and \$34,000 to dental clinic.

"Bright Eyes of 1934" is on the cover page. On the inside cover page: "Twentieth Annual Report of the National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y., 1934." The cover carries two bands, across top and bottom, containing baby faces. Dull finish paper and large type make it easy to look at.

Again the Racine, Wis., Health Dept., has issued a mimeographed annual report. On letter size sheets, with printed cover, and a 2-page index (includes reference to "publicity"). An effective form of report.

SAFETY

Ninety-nine thousand deaths by accident last year in the United States are reported in "Preliminary 1935 Edition of Accident Facts." This is a slight decrease from the 1930 all-time high, but is 8.7 per cent increase over 1933. In 9 months "had been drinking" drivers in fatal accidents increased 29 per cent and pedestrians 53 per cent. In non-fatal accidents "had been drinkers" increased 50 per cent, pedestrians 64 per cent. The report doubts that all drinkers were reported. The full report costs 10 cents. National Safety Council, 20 N. Wacker Drive, Chicago, Ill.

Enforcing a safety law by means of motion pictures is reported in *Movie*

Makers, 105 W. 40th St., New York, N. Y. (April, 1935: 25 cents):

The drunken drivers in Flint, Mich., now appear in 16mm. movies, since the Police Department of that city has scenes made of the offenders as they are brought into the police station. This new and remarkable use of the 16 mm. movie camera was initiated as a result of difficulty in getting convictions on charges of driving while drunk. . . .

To solve the problem, the Flint Police Department enlisted the aid of Theo. Brice, ACL, who, with a concealed motion picture camera, made some experimental scenes which were so successful in preserving the evidence of intoxication that the Police Department has installed a permanent, concealed 16 mm. movie camera. . . . Two No. 4 Photofloods illuminate the hilarious subject and a calendar and a clock are so placed as to be included in the shot, to be used later as evidence. It appears that the drunken offenders take little notice of the bright light which is turned on as they stagger across the room. The next day, the majority of them plead guilty when they are told that movies have been made of them the night before, while the offender who insists on an alibi has slight chance when the record is projected.

CHILDREN AND SCHOOLS

"The First Visit to the Dentist," by E. M. Kohlhepp, *Public Health Nursing*, 50 W. 50th St., New York, N. Y. May, 1935. 35 cents. When to visit and pointers in handling children. Good stuff for parent associations and other uses.

"Home-School-Community Relationships" is a 6 page mimeographed pamphlet based on experiences of teachers under these headings: "Some teachers visit homes"; "Parents are invited to school"; "Children take ideas home"; "Mothers' clubs and community groups are helpful"; "The public health nurse is invaluable." Other counties may wish to collect similar material. Cattaraugus County School Health Education Project, 302 Laurens St., Olean, N. Y.

"Home-School Relationships," in "A Project in Rural School Health Educa-

tion," by R. E. Grout. *Quarterly*, Milbank Memorial Fund, 40 Wall St., New York, N. Y.

June 19-21, 1935, is the date for the Eighth Health Education Conference, Iowa City, Iowa. The main theme: "Effective relationships in school health activities." If interested write to Anne Whitney, Am. Child Health Assn., 50 W. 50th St., New York, N. Y. Preceding this conference will be the 9th Iowa Conference on Child Development & Parent Education. Address: Iowa State University, Iowa City, Iowa.

"The School Camp," by H. S. Curtis. *Journal of National Education Assn.*, 1201 16th St., Washington, D. C. April, 1935. 25 cents. An important adjunct to the school.

"Self-selection of Food by Children," by C. M. Davis, M.D. *Am. Journal of Nursing*, 50 W. 50th St., New York, N. Y. May, 1935. 35 cents. How children in the orthopedic ward, Children's Hospital, Chicago, decide what they eat and how much, and how they gain weight, and the hospital saves on food costs.

"The Teaching of Social Hygiene During the Depression," by F. H. Richards. *Journal of Social Hygiene*,

50 W. 50th St., New York, N. Y. March, 1935. 35 cents. The medical director of William Penn High School for Girls, Philadelphia, mentions "the changes in the attitudes of the pupil during the last 5 years" and some of the incidental problems.

In *Hygeia* for May, 1935—*Hygeia*, 535 N. Dearborn St., Chicago, Ill., for May, 1935, contains:

May Day versus diphtheria. Diphtheria a dreaded scourge. What are your health frontiers? The care of the eyes in measles. Your child's face and future (cosmetic surgery). The mosquito (the twelfth parasite). Prenatal care. The menace of radio quackery. The nursing care of the sick child. Louis Pasteur. Why the baby has eczema. The live topic of the dead tooth (5th in a series). Infant foods approved. Eye diseases in adults (a series). New books on health. Questions and answers.

In "School and Health" will be found:

Studying the pupil's health. Health teaching in May. Solving health educational problems. Health without wealth (or added school costs). Pushing posture (by making it pleasing). A convincing experiment (with milk). Combining health habits with the new curriculum. New health books for teachers and pupils.

BOOKS AND REPORTS

Principles of Genetics and Eugenics

—By *Nathan Fasten, Ph.D.* Boston: Ginn, 1935. 407 pp. Price, \$2.80.

The purpose of the author in writing this book is to make the highly specialized subjects of genetics and eugenics more easily understood. Most of it is devoted to genetics; and some of the chapters describe the Inheritance of Acquired Characters, Germ Cells and Heredity, Sex and Its Determination, Monsters and Abnormal Individuals, the Immortal Germ Plasm, Mendelian Principles of Heredity, the Gene Hypothesis, Variation and Species Formation, and the Improvement of Organisms. At the end of the book, a few chapters describe Physical and Physiological Traits, Mental Traits and Social Factors, and Eugenics and Human Betterment. To add to the understanding of the topics, illustrations and figures are freely used; and to the completeness of the book, a comprehensive bibliography, a useful glossary, and a good index, are appended.

Moreover, the book is interesting, well written, and contains a great deal of useful information. It should be found valuable to lay readers who have a little knowledge of biology, to physicians and nurses who should disseminate more freely knowledge for the betterment of the human race, and especially to students to obtain a basic understanding of genetics and eugenics.

FRANCIS LOWELL BURNETT

Mouth Infection—By *Oliver T. Osborne, M.D.* New Haven, Conn.: Published by the Author, 1934. Price, \$2.00.

We regret that we cannot recommend this book. The case histories, which

are not case histories in any sense of the word, might well have been compiled by a layman. The information under the heading "My Conclusions" was common knowledge when the author began writing in 1917. His observations on dental conditions are quaint, with diagnoses such as "terrible pyorrhea, stinking teeth, rotten foul bridge, nasty infected mouth, plenty of odor," etc. The information that "Pivoted teeth are always a menace" will be received with surprise by dentists, as will also the statement that "most fillings of the canals of teeth will allow, sooner or later, distention of the canal. . . ." We cannot believe that the tooth brush is harmful as the author does: "It has been noted in primitive countries that when the bristle tooth brush was introduced into the schools, the children's teeth decayed faster than they ever did before."

The general object of the book, to show the importance of mouth infections and the close relationship between the professions of dentistry and medicine, is commendable. C. F. ELZEA

Sing Sing Doctor—By *Amos O. Squire, M.D.* Garden City, N. Y.: Doubleday, Doran, 1935. 296 pp. Price, \$2.50.

This is a well written and interesting story of the services of the author as consultant, chief physician, and again as consultant at Sing Sing Prison. It opens with an introduction by Lewis E. Lawes, the Warden.

It is evident that Dr. Squire has not been simply a routine doctor but has studied his cases and his duties carefully and has given much thought to what he has seen. As a result of his

experiences he is very much against capital punishment, and has devoted two chapters to a study of the question, giving many cases of failure of justice. The strain upon the prison physician, who for a long time was the only one who had the right to say whether or not a prisoner was insane, was terrific. Even more trying was the necessity of watching executions, giving the signal for the throwing of the switch, and the subsequent postmortems. Finally his daughter persuaded him to resign after he had realized that he had a dangerous "fixation."

The book is intensely interesting, but we can recommend it only to doctors, sociologists, penologists, and to others of mature mind who are interested in and not merely curious about such subjects. We do not believe that it would be wise to recommend it for general reading, and it should be withheld from young and immature people.

The printing and binding are excellent. There are four illustrations showing the prison. MAZÏCK P. RAVENEL

Ten Years of Rural Health Work, Rutherford County, Tenn., 1924-1933—*By W. Frank Walker, Dr.P.H., Director of Health Studies, The Commonwealth Fund. Published and distributed by The Commonwealth Fund, New York, 1935.*

Rutherford County, Tenn., has been notable among rural health units for its broad program and for the persistence of the agencies which have supported the enterprise over more than a decade. This brochure reflects the record over a period during which the technic of rural health administration was being established.

Very few such units can hope to have their record of accomplishment written by so discerning and understanding a friend as Dr. Walker, for he has been familiar with this county's work during its entire history and he has seen its

progress in the light of similar work elsewhere. There is a nice balance in this report as between the tangible, objective records and the proper emphasis on those personalities involved in Rutherford. The forewords by Dr. E. L. Bishop and Dr. H. S. Mustard give a hint of two very effective personalities which have been behind this project. Dr. J. B. Black carries on the tradition: "At the heart of every great enterprise is a personality."

Those who are concerned with the promotion of county health service will profit by this lucid account which has been kept simple and direct but which carries the refined experience of much sincere labor. Here is the story of one community where the job has been well done and where permanence seems assured. REGINALD M. ATWATER

Voluntary Sterilization—*By C. P. Blacker. New York: Oxford, 1934. 145 pp. Price, \$1.75.*

A well organized book, presenting a rational, convincing and timely plea for the need and method of restricting procreation among the mental defectives. The author deals primarily with the legal, social, and hereditary factors of the problem reserving comparatively little space for the technical description of the surgical procedures. The free use of references and statistics imparts an authoritative quality and greatly augments the value of the proposals and discussions. Liberal and intelligent treatment of the objections to sterilization further enhances the merit of the text.

Present economic stress has markedly accentuated the practical importance of negative eugenics so that the serious consideration of the subject is most opportune. Reasonable controversy may exist relative to the efficacy of sterilization as a means of appreciably reducing the incidence of mental deficiency in the next generation, yet it can hardly be

denied that these unfortunates are entirely unfitted and ill-adapted for parenthood in this highly competitive age. It is precisely this class that is unable to make use of mechanical or medicinal contraceptive devices. Surgical sterilization, without unsexing, is undoubtedly the only applicable and certain method of curtailing their fertility.

The reviewer hopes that this excellent book will be widely read by both the laity and profession.

R. S. HOTCHKISS

Growth and Development of the Young Child—By *Winifred Rand, Mary E. Sweeney, and E. Lee Vincent.* (2nd ed.) Philadelphia: Saunders, 1934. Price, \$2.75.

The high character of this useful textbook has been maintained in its second edition. The subject matter has been brought right up to date. A new chapter on biological development is interestingly written and well illustrated. It gives the necessary background to child growth and development. Recent advances in our knowledge of endocrine function and in nutrition add to the value of the volume. The same lucid style and convenient arrangement of chapters with references as appeared in the first edition enhances the value of this new one. The book is recommended especially to nurses, teachers, and others actively engaged in work for the preschool child.

RICHARD A. BOLT

Ideal Health: or The Laws of Life and Health—By *Alexander Bryce, M.D.* Baltimore: Wood, 1935. 330 pp. Price, \$2.00.

This small book with many anecdotes, narrates notions and discusses principles on the value of Food, Drink, Work, Rest, Air, Exercise, Cleanliness, and Clothing, to health; it also emphasizes the need of Regularity and Moderation, and describes the Influence of the Mind

on the Body, and Eugenics—or the Science of Race Culture. The discourse on each subject is prefaced with a law, as "Eat three meals each day of plain, wholesome, nourishing food, at or about the same time," and is summarized in numbered abstracts; and below some of the abstracts, common quotations, as "All work and no play makes Jack a dull boy," are given. Much of the information in the book has been taken from standard works, and is comprehensive and accurate.

Technical terms have been generally avoided in the text, and thus the book may appeal to lay readers; but its purpose is more to interest teachers of personal hygiene, students of medicine, and practitioners, in order that they may become more enlightened and thus diffuse the knowledge of health.

—FRANCIS L. BURNETT

The Art of Public Health Nursing—By *Edith S. Bryan, Ph.D., R.N.* Introduction by *Elnora E. Thomson, R.N.* Philadelphia: Saunders, 1935. 300 pp. Price, \$2.00.

Enough cannot be said in praise of Miss Bryan's contribution to the nursing profession in her new book just off the press. While written primarily for the public health nurse—its interpretation of the cultural, moral, and spiritual concepts of the underlying principles of nursing as an art—one cannot but hope that this book will be within the reach of every woman in the nursing field. The rural public health nurse is especially fortunate in having close at hand knowledge of the many little things that memory often fails to recall when she is occupied with major problems. Its pages supply the mental stimulus to carry on when one is lonely, discouraged, and weighted down by the sight of poverty with all its gloom. Let us own this book, read it often, and be inspired. The printing and binding are excellent.

ELEANOR KEELY

The Romance of Exploration and Emergency First-Aid from Stanley to Byrd. *New York: Burroughs Wellcome & Co., Inc., 1935.*

Messrs. Burroughs, Wellcome & Company need no introduction to Americans. Indeed we feel proud to know that the present senior member of the firm, Sir Henry Wellcome, is an American by birth and education. The firm has done an enormous amount of high class scientific work in research as well as manufacture.

The book before us is frankly an advertisement from the Chicago. Interna-

tional Exposition, 1934. However, it gives a very interesting account of explorers from Stanley to Byrd, richly illustrated and containing reproductions of many autographs.

It is a valuable history and book of reference concerning such men. The fact that so many of these explorers carried the first aid packages put up by the firm sufficiently attests their quality and the confidence reposed in them by governments as well as individuals. Here is an advertisement well worth preserving.

MAZÛCK P. RAVENEL

BOOKS RECEIVED

THE HARVEY LECTURES, 1933-1934. - Delivered under the Auspices of The Harvey Society of New York. Baltimore: Williams & Wilkins, 1935. 262 pp. Price, \$4.00.

OUTLINE OF TOWN AND CITY PLANNING. By Thomas Adams. New York: Russell Sage Foundation. 1935. 368 pp. Price, \$3.00.

TEN YEARS OF RURAL HEALTH WORK. Rutherford County, Tennessee, 1924-1933. By W. Frank Walker. New York: Commonwealth Fund, 1935. 82 pp.

COMMUNITY PROGRAMS FOR SUMMER PLAY SCHOOLS. By LeRoy E. Bowman. New York: Child Study Association of America. 1935. 48 pp. Price, \$.35.

THE FRUSTRATION OF SCIENCE. By Sir Daniel Hall *et al.* New York: Norton, 1935. 144 pp. Price, \$2.00.

SOME NOTABLE EPIDEMICS. By H. Harold Scott. Baltimore: Wood, 1934. 272 pp. Price, \$4.75.

THE DOCTOR'S BILL. By Hugh Cabot. New York: Columbia University Press, 1935. 313 pp. Price, \$3.00.

AIDS TO ANALYSIS OF FOOD AND DRUGS. By

C. G. Moor and William Partridge. 5th ed. Baltimore: Wood, 1934. 322 pp. Price, \$1.50.

EPIDEMICS AND CROWD-DISEASES. An Introduction to the Study of Epidemiology. By Major Greenwood. New York: Macmillan, 1935. 409 pp. Price, \$5.50.

ECONOMIC PROBLEMS OF MEDICINE. By A. C. Christie. New York: Macmillan, 1935. 242 pp. Price, \$2.00.

HAPPY HEALTH STORIES. By Mildred H. Comfort. Chicago: Beckley-Cardy Co., 1934. 159 pp. Price, \$.70.

SOCIAL WORK YEAR BOOK, 1935. By Fred S. Hall, Editor. New York: Russell Sage Foundation, 1935. 698 pp. Price, \$4.00.

SEDGWICK'S PRINCIPLES OF SANITARY SCIENCE AND PUBLIC HEALTH. Rewritten and Enlarged. By Samuel C. Prescott and Murray P. Horwood. New York: Macmillan, 1935. 654 pp. Price, \$4.25.

A NEW ANGLE ON HEALTH. By D. H. C. Given. London: John Bale, Sons & Danielsson, 1935. 158 pp. Price, \$3.25.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

About St. Louis Encephalitis—Reviewing briefly the findings of the outstanding research project conducted upon the St. Louis outbreak of encephalitis (reported in detail in a separate pamphlet), this excellent summary emphasizes the difference between this disease and the endemic form of encephalitis.

ANON. Infectious Encephalitis. Pub. Health Rep. 50, 16:542 (Apr. 19), 1935.

Mortality Rates Up in 1934—Preliminary mortality statistics from 28 states indicate an increase in death rates from 10.5 in 1933 to 10.9 in 1934. This increase, while not large, was widespread, for 22 out of the 28 states showed an increase. Infant mortality was also higher, 58 per 1,000 live births against 56 in 1933. The rates for a number of specific diseases are also reported.

ANON. Mortality in Certain States during 1934, with Comparative Data for Recent Years. Pub. Health Rep. 50, 17:560 (Apr. 26), 1935.

Treatment for Injured Miners—Certain trade and medical unions in Scotland have under consideration a scheme for the formation of an orthopedic association to provide treatment for injured miners. They propose to open a chain of clinics throughout the country, where they will provide massage, sun-ray exposure and other special treatment.

It is estimated that about 7,000 workers are injured annually in Lancashire, many becoming permanently crippled because of inadequate treat-

ment facilities. Should this experiment prove successful a similar one would be introduced for other workers.

ANON. Orthopedic Clinics for Miners in Scotland. Indust. & Labour Inf., 53, 4:110 (Jan. 28), 1935.

Compensable Diseases in New York State—A review of occupational disease claims closed in the State of New York during 1934, with statistics. As compared with 1933 there was an increase of 25 per cent in the number of closed cases. This apparent increase was due to an enlarged schedule of diseases listed in the law as compensable and to an improved method of recording such claims.

ANON. Occupational Poisons and Diseases, New York State, 1934. Indust. Bull., New York State Dept. of Labor 14 (Jan. 1), 1935.

Medical Examination in Japan—The Japanese Industrial Hygiene Association is advocating the extension of legislation which now calls for medical examination twice yearly of all industrial workers living in dormitories connected with factories, to include all workers employed in strenuous work, especially in chemical and heavy industries.

ANON. Industrial Hygiene in Japan. Indust. & Labour Inf. 53, 6:165 (Feb. 11), 1935.

France's Notifiable Diseases —Cases of notifiable diseases in France in 1933 were: lead poisoning, 704; mercury poisoning, 13; poisoning by benzene, 45; X-ray poisoning, 2; total, 764. This total was a decrease of 23 per cent over the previous year. Two

companies were responsible for 65.5 per cent of all cases.

ANON. Occupational Diseases in France. *Indust. & Labour Inf.* 53, 3:85 (Jan. 21), 1935.

Madrid Society for Industrial Hygiene—On January 18, 1935, the Spanish Minister of Labour inaugurated the Madrid Society for Industrial Hygiene, which body will advise the industrial courts on medical matters, and engage in research in silicosis, the indirect results of cranial traumata, and the problems of hernia and self-injury. In addition the society should help to prevent accidents and diseases, and collaborate in vocational training problems.

ANON. Industrial Hygiene Society in Spain. *Indust. & Labour Inf.* 53, 5:143 (Feb. 4), 1935.

Anthrax—There were 23 cases of occupational anthrax notified to the French Factory Inspection Service in 1933, two of which were fatal. Industries responsible for these cases were: wool, 12 cases; hides, 10; and horse-hair, 1. All of the cases were anthrax of the skin in various parts of the body.

ANON. Occupational Anthrax in France. *Indust. & Labour Inf.* 53, 5:143 (Feb. 4), 1935.

Lead and Zinc Processes—Czechoslovakia has under consideration a bill for the purpose of excluding women and young persons under 18 from employment in certain processes in the treatment and handling of lead and zinc, and laying down certain conditions to be observed in regard to the employment of adult male workers in such processes.

ANON. Lead Poisoning in Czechoslovakia. *Indust. & Labour Inf.* 53, 5:142 (Feb. 4), 1935.

Silicosis—The British Home Secretary made an order on January 29, 1935, extending the Various Industries (Silicosis) Scheme, 1931, to cover employment in any operation underground

in hematite iron ore mines. The order was issued under the Workmen's Compensation Acts and comes into force on March 1, 1935.

ANON. Compensation for Silicosis in Great Britain beginning March 1, 1935. *Indust. & Labour Inf.* 53, 7:202 (Feb. 18), 1935.

Infant Growth and Disease—Growth of infants from poor families may be raised to normal levels by adequate medical supervision; most of the delay in growth occurs in the first 12 weeks of life and undergrown children have higher morbidity and mortality rates than normal ones.

BAKWIN, H., and BAKWIN, R. M. The Importance of Medical Supervision during Early Infancy in the Infant Death Rate. *New York State J. Med.* 35, 7:313 (Apr. 1), 1935.

Morbidity vs. Mortality Rates—Age, case incidence, mortality and fatality curves show, for 18 disease groups in a representative population sample, great variations both in the diseases and the age groups. Contrast rather than similarity prevails between case incidence and mortality.

COLLINS, S. D. Age Incidence of Illness and Death Considered in Broad Disease Groups. *Pub. Health Rep.* 50, 15:507 (Apr. 12), 1935.

Industrial Accidents in Rumania—Number of accidents during period totalled 751. Men: 701 (93.3 per cent); women: 50 (7.6 per cent). The largest number of accidents among the women between the ages of 19 and 22 (34 per cent of total number of women) is due to the fact that a relatively large number of unmarried women work in industry. Of the 50 accidents to women, 39 were injuries to extremities, indicating inadequate vocational training. Although the law forbids industrial employment of minors, 3 children under 14 years suffered injuries. Inadequately trained 20 year old wood, mine, and railroad workers contributed 3.7 per cent of accidents. Cause of the

accidents could not be laid to the employer. The frequency of accidents decreases after the 40 year age group, although 18 (2.6 per cent) accidents occurred among men over 65 years of age.

CORUTIU, C. Industrial Accidents Among the Members of the Local Sickness Fund, Cluj. Rumania, During the Period 1919-1930. *Revista de Igiena Sociala*. V, 1 (Jan. 1), 1935.

Mottled Enamel in Texans' Teeth—The Panhandle-West Texas region constitutes the largest mottled-enamel area in the United States. The water supplies of the large cities contain the causative factor in sufficient concentration to constitute an urgent public health problem.

DEAN, H. T., *et al.* Mottled Enamel in Texas. *Pub. Health Rep.* 50, 13:424 (Mar. 29), 1935.

New Deal for Nurses—A fast moving picture of developments in nursing which have come to some parts of this country because of 3,000 new jobs for nurses in the public health field made available through F.E.R.A. funds.

DEMING, D. New Deals for Nurses. *Survey (Midmonthly)* 71, 4:107 (Apr.), 1935.

Measuring Dustiness—Report of the finding of a new instrument for measuring the dust content of air more satisfactorily than any of the previously known methods were able to do. The method is based upon the fact that heated bodies repel dust. When dust laden air is drawn slowly through a chamber traversed by an electrically heated wire, dust is repelled and collects upon the microscope cover-slips which form the wall of the chamber.

GREEN, H. L., and WATSON, H. H. Physical Methods for the Estimation of the Dust Hazard in Industry. Medical Research Council, Special Report Series, No. 199, 1934.

Shops Acts in Great Britain—An outline of such legislation in Great Britain with a simple review of its his-

torical development, and a consideration of its future possibilities. Includes a consideration of the Shops Acts—in England, Northern Ireland, and the Irish Free State. Book is reliable and readable.

HALLSWORTH, J. Protective Legislation for Shop and Office Employees. By George G. Harrap and Co., Ltd. London, 1935. 244 pp.

Babies Still Have Sore Eyes—The instillation of one drop of a germicide has been relied upon with a sense of complacent security too long. In Philadelphia far too much blindness due to ophthalmia neonatorum was found in a survey, and undoubtedly the same conditions exist elsewhere.

LEHRFELD, L. Limitations in Use of Silver Nitrate in Prevention of Ophthalmia Neonatorum. *J.A.M.A.* 104, 17:1468 (Apr. 27), 1935.

Toward the Solution of Social Medical Problems—In Mr. Milbank's answer to the caustic criticisms of organized medicine directed against the Fund's "lay" participation in the study of medical care, he presents an excellent distinction between health education and propaganda which all in the health field might well keep in mind.

MILBANK, A. G. The Relationship of the Milbank Memorial Fund to the Field of Health and the Medical Profession. *Milbank Quart.* 13, 2:99 (Apr.), 1935.

Diphtheria and Immunity—Occasional cases of diphtheria among Schick negative individuals lead these British authors to the conclusion that, though the principles underlying diphtheria immunization are sound, the antitoxic level needed to insure safety from virulent strains of diphtheria is higher than that indicated by the present Schick level. The need of higher degrees of immunity is suggested.

PARISH, H. J., *et al.* The Schick Test and Active Immunization in Relation to Epidemic Diphtheria. *Lancet*, 1, 11:600 (Mar. 16), 1935.

New Kind of Nursing Campaign—How the Visiting Nurse Association and the Board of Health combined forces to reduce the deaths due to pneumonia in Detroit.

SARGENT, E. A. Detroit's Pneumonia Nursing Campaign. *Pub. Health Nurs.* 27, 4:190 (Apr.), 1935.

Desired and Accidental Pregnancies—The past history of the contraceptive practices of a large group of women attending a New York birth control clinic was studied to reveal the results of their efforts to prevent or to induce conceptions. An interesting finding is that the ability to conceive does not decline with age or increasing order of pregnancy in the pre-menopause period.

STIX, R. K., and NOTESTEIN, F. W. Effectiveness of Birth Control. *Milbank Quart.* 13, 2:162 (Apr.), 1935.

Court Rulings on Pasteurization—Decisions are quoted which demonstrate that the courts realize the practical value of pasteurization in protecting the public health from milk-borne disease.

TOBEY, J. A. Pasteurization and the Courts. *New Eng. J. Med.* 212, 14:613 (Apr. 4), 1935.

More Uncomfortable Mortality Statistics—Though mortality rates in the 86 large cities were higher in 1934 than in 1933 or 1932, accidental deaths, tuberculosis, and the diseases of childhood are down; it is the diseases of middle life and old age that are up. A special survey in 10 cities showed the death rates to be 43 per cent higher among those families without a full-time worker than in those in which there was a full-time worker.

WIEHL, D. G. Recent Trends in Mortality in the United States. *Milbank Quart.* 13, 2:122 (Apr.), 1935.

Social Services Help to Maintain Health—Reporting a statement of the Minister of Health concerning the effect of social services in maintaining Great Britain's health. Despite prolonged unemployment, health in Great Britain has been maintained at a high level, as the result of the work of various agencies: health, unemployment, widows' and orphans' and old age insurance, public assistance, and public health services.

YOUNG, H. S. Social Services and Health in Great Britain. *Indust. & Labour Inf.* 53, 2:47 (Jan. 14). 1935.

ASSOCIATION NEWS

THE MILWAUKEE ANNUAL MEETING

OCTOBER 7-10

INSIDE INFORMATION ABOUT PROGRAMS

REQUESTS for program outlines and program information are frequent in the headquarters office these days.

The Section Secretaries are busy sifting new material and front-rank speakers from the many papers offered and invited. They feel that so much refinement of their programs is possible and desirable, in order to take advantage of the best material available, that it is unwise to make exact announcements at this time.

It is possible, however, to list some of the topics with which the delegates to the 64th Annual Meeting will be concerned during the week of October 7.

Mental Hygiene has been forging ahead so steadily in interest that an entire session will be devoted to it this year for the first time. Four papers and a discussion period are planned. Mental Hygiene from the point of view of the Province, the U. S. Public Health Service, the city health department, the health officer, and the school physician will be presented by outstanding health officials and psychiatrists.

Papers on Economic Consequences of Ill Health, on Health Department Functions—preventive, nursing, medical care, dental care, hospitalization and maternity care—and the Health Department Relationship to the Activities of the Welfare Department and of the Medical Profession will make up the program of the Special Session on the health department and the social security program. The contributors here will be health officers, economists, practising physicians, welfare directors, and officers of government.

The Fifteenth Anniversary of the Association's Committee on Administrative Practice is to be commemorated by a program in which those who have been most intimately connected with its development will review its history and accomplishments, detail the present status of its work, and cast an eye ahead upon its hopes for the future. An especially interesting paper will be a prominent city health officer's evaluation of the committee's past and present activities.

Dr. E. L. Bishop, President of the A.P.H.A., and Dr. Walter E. Brown, President-Elect, are always worth listening to, speaking as they do from a wealth of practical experience and personal philosophy. Dr. Bishop will be the main speaker at the first General Session on Monday evening, October 7, and Dr. Brown at the Banquet Session on Wednesday.

Professional Education is the subject for discussion at a luncheon meeting on Wednesday. Those who attended the very successful dinner meeting under the auspices of Dr. Leathers's Committee on Professional Education at Indianapolis—a session which gathered a large and distinguished audience—know the interest that exists in the education and training of health workers. The committee is prepared this year to make some important announcements of policies. Particularly in view of the new personnel that will certainly be drawn into public health work with the passage of the Social Security Bill, the determination of what constitutes adequate preparation for a

career in public health is of paramount concern.

Another luncheon session, now traditional at Annual Meetings, is the one devoted to Diphtheria Immunization. A committee representing the Health Officers and Laboratory Sections is at work and will present a report covering practices, experiences, and results during the year.

The many allied organizations and special groups that meet with the American Public Health Association add interest and variety to the proceedings. Joint sessions are being arranged by various Sections with the American Association of School Physicians, the International Association of Dairy and Milk Inspectors, the Association of Food and Drug Officials, the Conference of State Sanitary Engineers, the American Association of State Registration Executives. The Association of Women in Public Health, Delta Omega, Johns Hopkins, Massachusetts Institute of Technology and Harvard Alumni, and the Conference of State Laboratory Directors will dine, lunch or breakfast and confer.

The International Society of Medical Health Officers, of which Dr. John P. Koehler, Chairman of the Milwaukee Local Committee, is President, promises a large dinner party on Tuesday evening to which free tickets will be distributed to several hundred delegates. The after-dinner program will be brief, but impressive.

The 10 Section programs reflect present-day attitudes and are thoroughly infiltrated with social and economic significance. The federal health program is given a large share of attention, and its possibilities and implications are thoroughly covered. Picked at random, the following of the other hundred odd subjects will indicate the breadth and scope of Section activity:

Public Health Significance of Poisonous Substances in Foods

A Planned Milk Control for State and Nation
Standard Methods for the Examination of Shellfish
An Improved Agar for Use in Making Bacterial Counts from Milk
Proposed Changes in Standard Methods for Bacteriological Examination of Milk
Whooping Cough and Measles
Mentality and Morbidity
Pneumonia as a Community Health Problem
Child Health at Different Levels
Growth and Nutrition
Health Training and Instruction in Schools
Scarlet Fever
Animal Diseases Affecting the Public Health
Recent Progress in Biological Products
Customer Demand for Vital Statistics
Sanitation in Rural and Recreational Areas
Air Conditioning and Industrial Health
Occupational Diseases
Present Status of the Vitamin B Complex
Food Advertising under the Food and Drugs Act
Maternal and Neonatal Hygiene
Adequate Health Service for the Child
Commercial Advertising's Challenge to Health Education
Community Organization for Health Education
F.E.R.A. Problems
Typhoid Carriers
Institutional Outbreaks of Pneumonia

The preliminary program will be published in full in the September *Journal*. Watch for it, but do not wait until then to make your plans to attend the 64th Annual Meeting in Milwaukee, October 7-10.

ABOUT ENTERTAINMENT

FROM Dr. John P. Koehler, Chairman of the Milwaukee Local Committee, comes the following abbreviated and, he informs us, incomplete, table of entertainment events planned for delegates to the 64th Annual Meeting:

Sunday, October 6, 3 to 5 P.M. A "Milwaukee Kermis" at the Wisconsin Club. Appropriate music will be furnished and light refreshments. Milk, tea, coffee and beer will be served.

The purpose of the Sunday afternoon party is to provide the opportunity for members

to meet local people, to renew acquaintances in the Association, and to make new friends. It will be entirely informal. The Program Committee hopes the music will be the beloved *Deutsches Lieder*, sung by waiters garbed to create the proper atmosphere.

Monday, October 7, 10:30 to 1 A.M. Dancing in the beautiful Ball Room of the Hotel Schroeder, following the first General Session

Tuesday, October 8, 6 to 8:30 P.M. A dinner at the Schroeder Hotel through the courtesy of a Chicago sponsor, by the International Society of Medical Health Officers to the Members of the Governing Council, attending health officers and their friends.

The attendance is limited by the capacity of the dining room, which is approximately 600. Members of the Governing Council, prominent guests and Officers of the Medical Health Officers' Society will first be supplied with tickets, and the remaining tickets will be given out on the basis of "first come, first served" at the registration desk.

Wednesday, October 9, 3:30 to 5:30 P.M. A large, general entertainment feature for all the delegates and their friends—probably a boat ride.

The Program Committee has arranged no scientific sessions for Wednesday afternoon to permit a period of relaxation and recreation.

Wednesday, October 9, 11:00 P.M. to 1:00 A.M. Dancing following the Banquet.

At various times all through the week, inspection trips will be scheduled. Visits to the County Institutions, Health Centers, Sewage Disposal Plant, certified farms, park systems, and, of course, the breweries, are planned.

The entertainment program has been arranged by Dr. Koehler's Sub-Committee on Entertainment, of which Dr. B. L. Corbett is Chairman.

RAILROADS AND HOTELS

THE railroads have granted the Association's request for reduced convention fares to Milwaukee on the identification certificate plan. Rates from various central points and full information about the use of the certificates will be published in the *July Journal*. The pink slips identifying members will be mailed in August.

Milwaukee has many fine hotels with reasonably priced accommodations. A list of them with single and double room rates will be printed in the *July* issue. A coupon for making reservations will also appear.

CORRECTION

ON page 342 of the March, 1935, *Journal*, in Table III of "Public Health Degrees Granted in 1934," an error was made—the dagger indicating that public health courses were discontinued in 1934 should not appear after University of Michigan. These courses are continuing.

CULTURES IN THE DIAGNOSIS OF TUBERCULOSIS

IN the December, 1934, *Journal* there was an editorial under the title "Cultures in the Diagnosis of Tuberculosis." This commented on the work

of Evelyn M. Holmes, of England, as reported in a paper entitled "The Value of Culture in the Solution of Problems of Tuberculosis," in the *Journal of State Medicine* for October, 1934, page 561.

The author has asked us to publish a correction in the formula as given in the original publication, which is that the magnesium sulphate should be 0.04 per cent, instead of 0.4 per cent. The formula follows:

Potassium sulphate	0.4 per cent
Magnesium sulphate	0.04 per cent
Magnesium citrate	0.1 per cent
Asparagin	0.6 per cent
Glycerine	2.0 per cent
aq. destill	

NEW MEMBERS

IN reporting below the latest group of applicants for membership in the American Public Health Association, the Committee on Fellowship and Membership wishes to take this opportunity of recording its appreciation of the efforts of the New York State Department of Health resulting in so many applications, and to urge other state and city health commissioners to make a similar attempt to increase the number of members in the Association. As Dr. Thomas Parran, Jr., has aptly stated: "Membership in the American Public Health Association is a real asset to all of us who are in public health work as a career. The only vigor or vitality any association of this kind can have is that asserted by its membership. Each year a number of members are lost through death, resignation, etc. These

vacancies must of necessity be filled from the younger and the more recent additions to the profession. It is therefore of importance that each year a definite and concerted effort be made to enroll as new members those who are interested in public health who are not already a part of this organization. It seems to me that this is a proper activity of the state and larger city departments. Certainly we should do our part to encourage all public health workers in the state to be aligned with their own national organization."

If any of our constituents are interested in helping the Association expand, the Committee on Fellowship and Membership will gladly furnish them with the necessary material and any other assistance they may require.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Charles A. Bailey, M.D., Apartado 679, Mexico, D.F., Mex., Field Director, Rockefeller Foundation
 J. Douglas Barry, M.D., 205 Nelson Ave., Peekskill, N. Y., Health Officer
 Angel de la Garza Brito, M.D., Ave. Alvaro Obregon 190 A, Mexico City, Mex., Supervisor General, Dept. of Health
 F. F. Chaya, M.D., 22 Main St., Yorkville, N. Y., Health Officer
 Roy L. Cleere, M.D., 424 State Office Bldg., Denver, Colo., Secretary and Executive Officer, Colorado State Board of Health
 Dr. C. E. Elkins, 92 Andrews St., Massena, N. Y., Health Officer
 Henry E. Elwood, Jr., M.D., 144 E. First St., Corning, N. Y., Health Officer
 Earl H. Engel, M.D., 114 Maple St., Wyandotte, Mich., Health Officer
 Daniel C. Fisher, M.D., Clarence Center, N. Y., Assistant District State Health Officer

Louis H. Fligman, M.D., 401 Power Block, Helena, Mont., Member, State Board of Health
 Charles C. Gans, M.D., Community Hospital, San Mateo, Calif., Director, Public Health and Welfare, San Mateo County
 Joseph P. Garen, M.D., 140 N. First St., Olean, N. Y., City Health Officer
 Burton A. Hall, M.D., Oxford, N. Y., Health Officer
 Edgar C. Harper, M.D., Abingdon, Va., Deputy Director of Rural Health, State Health Dept.
 Charles R. Haskin, M.D., 12 Vincent Ave., Chautauqua, N. Y., Health Officer, Chautauqua Institution
 George A. Hays, M.D., State Dept. of Health, Jefferson City, Mo., Director, Rural Health Work
 M. R. Kukuk, M.D., 2405 Franklin Ave., Toledo, O., Lucas County Health Commissioner

Frederick S. Leeder, M.D., D.P.H., 117 Crescent St., Allegan, Mich., Director, Allegan County Health Dept.
 Charles Lipsky, M.D., 162 Howard Ave., Brooklyn, N. Y., Medical Inspector, Bureau of Child Hygiene, Dept. of Health
 Gregory D. Mahar, M.D., 302 City Hall, Syracuse, N. Y., Commissioner of Health
 Thomas A. McGrath, M.D., 10 John St., Hoosick Falls, N. Y., Health Officer
 John G. Norris, M.D., St. Joseph, La., Director, Tensas Parish Health Unit
 Byron L. Pampel, M.D., Livingston, Mont., Member, State Board of Health
 John M. Quinn, M.D., 41 S. Corona Ave., Valley Stream, N. Y., Health Officer
 Dr. Domingo F. Ramos, Direccion de Sanidad, Havana, Cuba, Director of Sanitation
 George L. Rianhard, City Hall, Coral Gables, Fla., Health Inspector
 Ardeen E. Richmond, M.D., Wayland, N. Y., Health Officer
 Rudolph Ruedemann, Jr., M.D., State Dept. of Health, Albany, N. Y., Medical Consultant, Division of Social Hygiene
 Edwin H. Schorer, M.D., City Hall, Kansas City, Mo., Director of Public Health
 Leigh A. Simpson, 11 S. 3rd St., Fulton, N. Y., Health Officer
 Ralph B. Smallman, M.D., Corfu, N. Y., Health Officer
 Albert F. Soch, M.D., 40 E. Main St., Fredonia, N. Y., Health Officer
 Edgar E. Stewart, M.D., 25 Maple Drive, Great Neck, N. Y., Health Officer of Villages of Great Neck Estates
 Sidney S. Wasserstrom, M.D., 1877 Ocean Ave., Brooklyn, N. Y., Medical Inspector, New York City Health Dept.
 Joseph Weinstein, M.D., M.S.P.H., 783 Fox St., New York, N. Y., Assistant District Health Officer, New York City Health Dept.
 James W. Young, M.D., 9615 Brighton Way, Beverly Hills, Calif., Assistant Health Officer
 Alexander Zabin, M.D., 11 Nottingham Rd., Malverne, L. I., N. Y., Health Officer

Laboratory Section

William Antopol, M.D., Bayonne Hospital, Bayonne, N. J., Pathologist and Director of Laboratories
 Joseph O. Collins, M.D., Waterbury Hospital, Waterbury, Conn., Director, Hospital Laboratory
 Israel Davidsohn, M.D., 2750 W. 15th Place, Chicago, Ill., Pathologist, and Director of Laboratories, Mt. Sinai Hospital
 John V. Donnet, M.D., 57 West 57 St., New

York, N. Y., Member of Committee on Clinical and Pathological Laboratories
 Frederick Eberson, M.D., Ph.D., Dept. of Public Health, San Francisco, Calif., Epidemiologist, Bureau of Communicable Diseases
 John J. Engelfried, M.S.P.H., University Hospital, Ann Arbor, Mich., Student, Contagious Laboratories
 Maxwell J. Fein, M.D., 50 Greene Ave., Brooklyn, N. Y., Pathologist, U. S. Army
 Patricia Fleming, B.S., State Dept. of Public Health, Springfield, Ill., Bacteriologist, Division of Laboratories
 E. D. Furrer, M.D., 130 E. Broadway, Eugene, Ore., City Bacteriologist
 McLeod Gillies, M.D., Mountain State Hospital, Charleston, W. Va., Laboratory
 Alfred E. A'C. Hudson, D.Sc., Lee Memorial Hospital, Fort Myers, Fla., Director of Laboratories
 Clarence M. Hyland, M.D., 4614 Sunset Blvd., Los Angeles, Calif., Director of Laboratories, Children's Hospital
 Joseph A. Kasper, M.D., Herman Kiefer Hospital, Detroit, Mich., Director, Bureau of Laboratories, Dept. of Health
 Ludwig Lindberg, M.D., 1407 S. Hope St., Los Angeles, Calif., Pathologist
 Dr. Thomas B. Magath, Mayo Clinic, Rochester, Minn., Division of Clinical Pathology, Dept. of Parasitology
 George R. Moffitt, Harrisburg Hospital, Harrisburg, Pa., City Bacteriologist and Chemist
 Gertrude Moore, M.D., 2404 Broadway, Oakland, Calif., President-Secretary, Western Laboratories
 Frederick W. Shaw, M.D., Medical College of Virginia, Richmond, Va., Professor of Bacteriology and Parasitology
 Philip L. Varney, Ph.D., Washington University School of Medicine, St. Louis, Mo., Instructor, Dept. of Bacteriology and Public Health

Vital Statistics Section

May A. Burgess, Ph.D., 4615 Livingston Ave., New York, N. Y., Volunteer study in field of growth statistics
 Ernest G. Carscallen, A.B., 903 N. Broadway, Baltimore, Md., Student Assistant, Dept. of Biostatistics, Johns Hopkins School of Hygiene and Public Health

Public Health Engineering Section

John C. Cochrane, Jr., 605 Hardy & Hayes Bldg., Pittsburgh, Pa., Engineer, Wallace & Tiernan Co.
 Thomas M. Riddick, M.S., 1920 Osborne

Place, New York, N. Y., Sanitary Engineer
 Embert H. Sprague, B.S., University of
 Maine, Orono, Me., Professor of Sanitary
 Engineering

Industrial Hygiene Section

Elmer G. Balsam, M.D., Box 1324, Billings,
 Mont., Member, State Board of Health
 William B. Fulton, M.D., Dept. of Labor &
 Industry, Harrisburg, Pa., Chief, Industrial
 Hygiene, Bureau of Industrial Standards
 S. Edward King, M.D., 33 Fifth Ave., New
 York, N. Y., Medical Director
 Fredia Patten, R.N., Southern Alkali Corp.,
 P. O. Box 1591, Corpus Christi, Tex., In-
 dustrial Nurse
 Max Trumper, Ph.D., 920 Medical Arts Bldg.,
 Philadelphia, Pa., Consultant in Industrial
 Toxicology

Food and Nutrition Section

Robert McD. Allen, 122 Hudson St., New
 York, N. Y., President, Vegex Inc.

Child Hygiene Section

Edith M. Buyer, M.D., Albert Leonard
 Junior High School, New Rochelle, N. Y.,
 School Medical Supervisor, Board of Edu-
 cation
 Jean M. Henry, Wellington Hotel, Albany,
 N. Y., Consultant Nurse

Public Health Education Section

Edwin C. Braynard, M.D., 47 Highland Rd.,
 Glen Cove, N. Y., Health Officer, East
 Hills, N. Y.
 Eugene A. Fierro, M.D., 320 E. 57 St., New
 York, N. Y., Instructor in Public Health,
 New York Homeopathic Medical College
 & Flower Hospital
 Hugh G. Henry, M.D., Germantown, N. Y.,

Prenatal Clinics and Luetic Clinics, Colum-
 bia County Dept. of Health
 Irwin I. Lubowe, M.D., 505 West End Ave.,
 New York, N. Y., Practising Medicine
 Eunice I. Nickerson, C.P.H., 488 Whitney
 Ave., New Haven, Conn., Research As-
 sistant in Public Health, Yale University
 James H. Stone, C.P.H., Williamsburg, Va.,
 Instructor in Bacteriology and Public
 Health, College of William & Mary

Public Health Nursing Section

Mary B. DeLas, Indianola, Miss., Public
 Health Nurse
 Bertha Jenkins, R.N., Saanich Health Dept.,
 Royal Oak, B.C., Canada, Supervisor,
 Health Dept.
 Mary E. Wiseman-Herndon, R.N., Perry,
 Fla., Public Health Nurse, Taylor County

Epidemiology Section

Harry L. Chant, M.D., 4 Jewett Parkway,
 Buffalo, N. Y., Epidemiologist-in-training,
 State Dept. of Health
 Samuel Hyman, M.D., 556 Park Ave., Albany,
 N. Y., Epidemiologist-in-training, State
 Dept. of Health
 Mildred E. Shellig, M.D., 395 Myrtle Ave.,
 Albany, N. Y., Epidemiologist-in-training,
 State Dept. of Health
 Dr. Frutos Solon Nunez, San Jose, Costa
 Rica, Minister of Health

Unaffiliated

Margaret Bullowa, 62 W. 87 St., New York,
 N. Y., Medical Student, New York Uni-
 versity Medical College
 J. Louis Neff, 1527 Franklin Ave., Mineola,
 N. Y., Executive Secretary, Nassau County
 Medical Society

CLOSING DATE FOR FELLOWSHIP APPLICATIONS

THE Committee on Fellowship and
 Membership wishes to announce
 that August 1 is the closing date for
 accepting Fellowship applications for
 action at the Milwaukee Annual Meet-

ing. Eligible members who desire to
 apply for Fellowship this year are re-
 quested to submit their applications to
 the committee as much in advance of
 August 1 as possible.

Report on a Meeting to Discuss Standard Methods for the Examination of Shellfish

AT the request of C. A. Perry, Referee for the Laboratory Section on Laboratory Methods for the Examination of Shellfish, a conference was called at the Army Medical Center in Washington, D. C., on April 18, 1935. The following were present: L. M. Fisher, Chairman of the Committee on Shellfish of the Public Health Engineering Section, A. C. Hunter, representative of the Food and Nutrition Section, A. P. Hitchens, Chairman of the Coördinating Committee on Standard Methods and R. S. Breed, Chairman of the Committee for the Examination of Dairy and Food Products for the Laboratory Section, W. R. Berry, R. Messer, R. E. Tarbett, and others interested in the sanitary control of shellfish.

Under the leadership of Dr. Perry there was a full discussion of the nature of the control that should be exercised over shellfish production areas; the type of laboratory examination that should be carried out for oysters in the shell, shucked oysters, and other shellfish; and of the type of examination that should be made on oysters after they are received in consuming centers.

It was pointed out that in the preparation of any comprehensive report on methods of controlling the sanitary condition of oysters and other shellfish there should be a discussion of the

biology of shellfish so far as it has a bearing on the sanitary condition of the water in which these shellfish live. There was a general feeling that if the entire shell contents of the oyster are used as a source of the sample the results of the laboratory examinations would be more valuable, and that the laboratory methods should be such as would distinguish between *Escherichia coli* and other members of the colon group.

It was pointed out that there was genuine need for the preparation of a comprehensive report on shellfish examinations which would cover not only pertinent facts regarding the biology of shellfish and the sanitary condition of production areas, but also laboratory methods for the examination of oysters and other shellfish as shipped, and after receipt in consuming centers. It was not felt that the information at hand justified the fixation of definite sanitary standards. Objection was made to the fixation of absolute standards by the American Public Health Association on the ground that the existence of definite standards might embarrass official control agencies in legal procedures. On the other hand, all agreed that limits of pollution could be given for oysters and oyster waters in the form of carefully phrased recommendations.

Meeting of the Committee on Standard Methods for the Examination of Dairy and Food Products

THE Laboratory Section Committee covering Standard Methods for the Examination of Dairy Products met April 8, 1935, at Geneva, N. Y., with the following referees present: F. C. Blanck, Referee for Chemical Methods, A. H. Robertson, Referee for Methods of Counting Bacteria, Mac H. McCrady, Referee for Methods of Detecting Specific Types of Bacteria, G. J. Hucker, Associate Referee for Methods of Identifying Streptococci, R. S. Breed, Chairman.

There was some discussion over the need for methods for determining total solids in plain ice cream and for determining small amounts of nutritionally important minerals in milk. Dr. Blanck, speaking as President of the Association of Official Agricultural Chemists, and as a member of the committee, expressed the satisfaction of the A.O.A.C. with the present arrangement regarding the publication of *Standard Methods of Milk Analysis*.

Discussion developed the need for broadening the scope of the present report to cover the examination of dairy products other than milk and this led to the suggestion that the title of the next edition of the report should be "Standard Methods for the Examination of Dairy Products" rather than "Standard Methods of Milk Analysis." Only methods of value in official control work are to be included, however, in order that the report may continue as authoritative in its own field.

Consideration was given to methods

of securing more satisfactory incubation procedures in public health laboratories that are using the standard agar plate count, and to the problems that will arise if an agar of more satisfactory composition is substituted for the meat extract-peptone agar now in use.

It was reported that only minor criticisms and suggestions have been received thus far regarding the methods suggested by W. A. Hagan and I. F. Huddleson for detecting the presence of tubercle and Bang's disease organisms in milk. The section in the present report giving tentative methods for the detection of organisms of the colon group was discussed from various standpoints. Research work is showing more clearly than ever that the presence of organisms of the colon group in milk and dairy products does not have the significance that the presence of organisms of the colon group in water and sewage has. Effective use is being made of tests for organisms of this group in detecting inefficient pasteurization and in the control of recontamination of milk during the bottling process.

Through A. H. Robertson, who is also Chairman of the Committee on Bacteriological Methods of the International Association of Dairy and Milk Inspectors, a questionnaire covering the new ice cream section of the *Standard Methods of Milk Analysis* is being sent to the list of individuals and laboratories interested in this type of work that is maintained by the American Public Health Association.

Committee on Professional Education Meeting

A MEETING of the Committee on Professional Education was held in New York on May 4. This committee is one of the Five Standing Committees of the Association and is charged with carrying out studies for development of standards for professional education in public health work.

The committee and its various sub-committees have been giving consideration to the problem of educational qualifications of health officers, public health engineers, sanitarians, and public health nurses.

A draft of the Second Report on the Education and Qualifications of Health Officers was circulated to a list of about 200 members of the Association, and comments were received from 75, indicating the widespread interest in this subject. It was particularly significant to note the thoughtful consideration which the report provoked and the helpful suggestions made by many of the commentators.

Committee reports were unanimously adopted bearing on the education of health officers and public health engineers, and a report on the educational qualifications of sanitarians was brought up to the point of final revision. Progress reports were received from other sub-committees who are interested in different professional groups, including vital statisticians, health edu-

cators, and public health nurses. These reports will be presented through the Executive Board to the Governing Council at the Annual Meeting.

It was reported by the Sub-Committee on the Training of Undergraduates in Medical Schools that visits are now being made by representatives of leading medical colleges to the departments of preventive medicine of selected schools throughout the country, giving an opportunity for the exchange of ideas, methods of presentation of material, and suitable technic for teaching preventive medicine in medical schools.

The committee is planning to hold a special luncheon session at the Milwaukee Annual Meeting, and an interesting program is being developed. It is felt that the work of this committee is of such importance to the future of public health work that opportunity should be given to the membership to familiarize itself with its activities.

It is believed that the steps taken at the May meeting were highly important, reflecting as they do the long continued interest in this field by the American Public Health Association, and the intensive review of professional education given by a large number of specially qualified members of the Association.

NEWS FROM THE FIELD

DR. REYNOLDS NEW SURGEON GENERAL OF ARMY

COLONEL Charles R. Reynolds, Surgeon of the Army's Second Corps Area, at Governors Island, N. Y., was nominated by President Roosevelt for Surgeon General of the Army, with the rank of major general. He will succeed Major General Robert U. Patterson, whose term expires June 1.

Colonel M. A. Shockley, Commander of Letterman General Hospital at the Presidio in San Francisco, was nominated by the President as Assistant Surgeon General with the rank of brigadier general.

ARIZONA ASSOCIATION ELECTS OFFICERS

AT its meeting on April 24, the Arizona Public Health Association elected the following officers:

President—A. N. Crain, M.D., Phoenix

First Vice-President—Lydia Pothoff, Nogales

Second Vice-President—F. C. Roberts, Jr., Phoenix

Secretary-Treasurer—Jane H. Rider, C.E., Tucson

The next annual meeting of this organization will be held in April, 1936, at Tucson, Ariz.

DRINKING WATER

TRAVELERS will be interested to know that the sources of drinking and culinary water used on interstate railroads, buses, vessels, and airplanes are inspected and certified by the U. S. Public Health Service. Ninety-four per cent of these supplies were inspected and certified during the year. It was found necessary to prohibit the use of 28 of these supplies.—*New York State J. Med.* 35, 3:116 (Feb. 1), 1935.

MARYLAND-DELAWARE SEWERAGE CONFERENCE

AT the Ninth Annual Conference of the Maryland-Delaware Water and Sewerage Association, which was held at the State House, Annapolis, May 16-17, Prevention of water pollution, Comprehensive planning for water supply and sewerage systems, and other engineering problems of special concern to state, city, and county departments of health were discussed.

PENNSYLVANIA SEWAGE ASSOCIATION MEETS

THE Ninth Annual Conference of the Pennsylvania Sewage Works Association will be held at State College, Pa., June 24-26. Numerous papers of importance will be presented.

FREDERICK L. HOFFMAN RETIRES

AFTER 42 years of service with the Prudential Insurance Company of America, during which time he acquired international recognition as a foremost statistician, Frederick L. Hoffman, LL.D., a member for 28 years and a Charter Fellow of the A.P.H.A., was retired from active duty on May 1.

Dr. Hoffman, who was born in Varel, Grand Duchy of Oldenburg, Germany, on May 2, 1865, came to this country when he was 19 and after a brief mercantile experience became associated with the Metropolitan Life Insurance Company. In 1891, he became affiliated with the Life Insurance Company of Virginia and 2 years later became Statistical Assistant in the Prudential's Actuarial Department. His literary contributions to insurance, statistics, and social science have numbered scores and he has appeared as an authoritative

lecturer on insurance and public health subjects before leading universities throughout the country, some of his notable works being devoted to cancer, tuberculosis, statistics, malaria, radium necrosis (mesothorium), earthquake hazards and aviation.

In 1934, Dr. Hoffman, with the consent of the Prudential, presented to the Cancer Research Laboratories of the University of Pennsylvania Graduate School of Medicine his library on that subject and it was hailed as a notable event in the medical history of Philadelphia in an official statement by the *Pennsylvania Gazette*.

Dr. Hoffman does not intend abruptly to abandon his work. After a needed vacation he will continue his research on cancer, maintaining an office in the Laboratories of the University of Pennsylvania.

SUMMER TOUR

THE Health Section of the World Federation of Education Associations is arranging a European travel and study tour in connection with the Federation meeting at Oxford, England, August 10-17. Leaving New York June 29, the tour will visit France, Switzerland, Germany, Poland, Russia, Finland, Sweden, Denmark, and England. The group will meet leaders in school health in these countries.

Write for information to Professor C. E. Turner, Massachusetts Institute of Technology, Cambridge, Mass.

RESIGNATION OF MR. KINGSBURY

JOHN A. Kingsbury, LL.D., Fellow and Life Member, American Public Health Association, has resigned as Secretary of the Milbank Memorial Fund of New York. Mr. Kingsbury has served as Secretary with the Fund since 1922 and for the last year has been a member of the Board of Directors of the Fund. During his administration a very definite trend of increased in-

terest toward public health activities has been noted and there has been created a technical staff of national distinction. During Mr. Kingsbury's tenure, Edgar Sydenstricker became Director of Research. I. S. Falk, Ph.D., has for several years been a member of the staff. In addition to the well known rural, city, and metropolitan health demonstrations conducted by the Fund, there have been numerous studies of public health practice with special reference to the measurement of results to be obtained from public health service. The Fund was a large contributor to the study of the Committee on the Costs of Medical Care and, since the report of this committee, has continued an analysis of the data with special reference to the bearing of these data on sickness insurance. Mr. Kingsbury has been responsible for the publication by the Fund of the Studies on Medical Care in Europe by Sir Arthur Newsholme, and with Sir Arthur, Mr. Kingsbury was co-author of the work, *Red Medicine*.

FRANKLIN H. MARTIN

FRANKLIN H. Martin, M.D., LL.D., D.Sc., D.P.H., distinguished in American medicine as a surgeon, educator, author, and organizer of unusual resourcefulness, died recently in Phoenix, Ariz., at the age of 78.

He was founder of *Surgery, Gynecology and Obstetrics*. Dr. Martin was a member of numerous professional organizations in this country and honorary fellow of medical and surgical societies of several South American countries. In recognition of his services, he received awards from the United States, England, and Italy.

His contributions to medical literature include *Fibroid Tumors of the Uterus*, *Treatise on Gynecology*, and *South America from a Surgeon's Point of View*. He was also author of a monograph, *Australia and New Zealand*. His autobiography was published

under the title, "Joy of Living," in 1933.

FIELDING HUDSON GARRISON

FIELDING HUDSON GARRISON, Colonel U. S. Army, Retired, of Baltimore, Md., most eminent American medical historian, died April 18, 1935, at the age of 64.

Col. Garrison was Assistant Librarian at the Army Medical Library in Washington for 33 years, from 1889 to 1922. He served in the Philippines from 1922 to 1924, and in 1925 he was appointed Consulting Librarian to the New York Academy of Medicine. In 1930 he was appointed Librarian of the Welch Medical Library at the Johns Hopkins University School of Medicine, and also resident lecturer in the history of medicine.

He was co-editor of the *Index Medicus* at the Surgeon General's Library from 1903 to 1912, and editor from 1912 to 1927. His Book *An Outline of Medical History*, is recognized as a classic throughout the civilized world. He was the author also of numerous monographs.—*J.A.M.A.*, 104, 17:1540 (Apr. 27), 1935.

MIDWIFERY PRACTICE IN NEW YORK

FOLLOWING a conference with New York Health Commissioner John L. Rice, Hospital Commissioner S. S. Goldwater announced—the first week of May—the discontinuance of the Bellevue Training School for Midwives.

If the present trend in the reduction of midwife practice continues, it is stated, the proportion of births attended by midwives will amount to less than 2 per cent 10 years from now. In 1934 midwives attended only 5,000 of the 101,239 births in the City of New York, less than 5 per cent, representing a decline since 1914 of 35.3 per cent. The number of midwives licensed to practice in New York City reached a

maximum of 1,799 in 1916, whereas now there are only 700, of whom 30–40 per cent are reported inactive.

TOURISTS IN MEXICO

WHILE in Mexico City recently, J. C. Geiger, M.D., F.A.P.H.A., of the Department of Public Health of San Francisco, made a study of requirements made by the authorities in Mexico of tourists.

He is preparing a program related to the requirements of tourists between the United States and Mexico, which will be submitted for the approval of the health authorities of both countries.

DIABETIC PATIENTS CENSUS

THE New York City Department of Health is making an effort to place all persons with diabetes under the care of licensed physicians, and has for that reason sent a letter to all physicians in the city asking them to inform the department of the number of diabetic patients under their care.

Health Commissioner John L. Rice states that many diabetic patients are using trick diets and harmful nostrums, alleged substitutes for insulin. Information assembled by the New York Diabetes Association indicates that there are as many as 100,000 diabetic persons in the city.

NUTRITION PROJECT IN MICHIGAN

THE Michigan State Emergency Welfare Relief Commission, the Children's Fund of Michigan, and the State Department of Health are coöperating in a program to prevent an increase in scurvy and other dietary deficiency diseases among infants and young children, and to assist in making necessary medical care available for needy prospective mothers. The Michigan branch of the American Academy of Pediatrics is acting in an advisory capacity. Members serve as consultants to work with

the county medical societies and nurses in their respective districts.

The project will continue over a period of 6 months. According to the state medical journal, the work is based on home calls to families on relief or near the borderline in which there are prospective mothers or young children. The expectant mother receives suggestions and, in families with infants, special attention is paid to dietary supervision to guard against scurvy and rickets.

The project was begun at the suggestion of Dr. Thomas B. Cooley, of Detroit, President of the American Academy of Pediatrics. — *J.A.M.A.*, April 27, 1935.

NEW CANCER JOURNAL IN BUDAPEST

ACTA Cancerologica is the title of a new publication dealing with all aspects of cancer. It is published in Budapest and is edited by Dr. Gereb, assisted by Professor Ferdinand Blumenthal, now director of the Cancer Institute in Belgrade. Papers will be published in German, French, and English.

NEW JOURNAL ON IMMUNOLOGY

THE first issue of the *Revue d'immunologie*, Paris, appeared in January, 1935. The editors, all well known in the field of immunology, are Professors Robert Debré, G. Ramon, and Pasteur Vallery-Radot, the grandson of Louis Pasteur.

NEW HEALTH DISTRICT IN NEW YORK

ANEW health district has been established in Tompkins County, N. Y., with headquarters at Ithaca, as a coöperative project of the U. S. Public Health Service, the New York State Department of Health, and the Tompkins County Development Association.

Dr. Vivian A. Van Volkenburgh,

F.A.P.H.A., formerly associate in epidemiology at Johns Hopkins University School of Hygiene and Public Health, Baltimore, Md., is head of the staff.

The new district is the first to be developed under the plan for federal aid to rural areas for health work. — *J.A.M.A.*, April 27, 1935.

PUBLIC RESPONSIBILITY FOR PUBLIC AND PERSONAL HEALTH

AN integrated plan of public health, public medical service and private practice was urged as preferable to health insurance for New York State by Thomas Parran, Jr., M.D., State Commissioner of Health, in the 1935 Biggs Memorial Lecture delivered on May 2 at the New York Academy of Medicine. The thesis of Dr. Parran's talk was the health center plan devised by Dr. Biggs and urged by him upon several sessions of the Legislature from 1919 until his death. This plan contemplated a public medical and health service to be administered by local health departments under state supervision and aid, combined with an improved, private practice in a logical system for all citizens in need of such service. Some of the major points of the lecture are summarized below:

For a sizable proportion of the population, socialized medical care is an accomplished fact, but much of it is at the expense of the doctor and therefore less equitable than when financed by public taxes. . . .

A united attack by private physicians and public health authorities should be made against the catastrophic and chronic diseases of the poorly-paid employed classes who far outnumber in the population the one-seventh now on relief. The majority of these persons are able and willing to bear the cost of private medical care for illnesses which can be treated at home or in the doctor's office. . . .

The whole effort for human betterment has been handicapped because in this nation medicine is not now a vital force in the councils of government. Through the integration and union of needed preventive and curative medical efforts and through the pro-

vision of public medical care, as a matter of right and not of charity for those in need of it, medicine can assume its rightful position of leadership in humanizing society.

The most vocal members of the medical profession up to now, however, have been filled with the fighting spirit of the guilds and trade unions. They have been concerned primarily with protecting the *status quo* and in opposing so-called inroads upon their traditional prerogatives. But the rank and file of medical men have quietly and patiently been carrying the load of unpaid service for their unfortunate fellow men. They could do this easily enough when medical charity was required for no more than 2 per cent of the average practice. Now, unfortunately, many a formerly prosperous doctor has been almost overwhelmed by the need for free service among his patients. Yet still these unsung heroes of medicine have carried on. . . .

The groups needing public care for costly illness might be defined as including all manual laborers and their families, all persons participating in the proposed old age annuity plan or unemployment insurance and all others having an annual income of less than \$2,500. In determining the diseases and conditions which should be cared for at public expense, consideration must be given to the cost of treatment and the extent to which the particular disease or condition is "endowed with a public interest." The types of medical care which should be provided at public expense in whole or in part for the lower economic groups of the population he outlined as: facilities for accurate diagnosis, obstetrical care, hospital care, home nursing and treatment of chronic diseases. . . .

To provide an adequate and decent medical service to our public charges and to extend to the low-income group treatment for the catastrophic and chronic illnesses requiring costly diagnosis and long hospitalization is a necessary public health obligation. "I believe that in the long range it will be financially profitable, through the lightening of our ever-growing load of unemployables. And, I believe that Dr. Biggs would stir anew to the spirit of his thesis of 1882—'There are other considerations far higher than the financial which render government action in regard to the public health imperative.'"

Dr. Parran stated that, in his opinion, it would be desirable to unify under health departments, state and local, medical functions now performed by welfare officers.

Biggs had an orderly and logical mind. These qualities tempered his idealism and his professional vision. "Think things through" was his motto. No one before or since his time has combined with such idealism so practical a program for meeting the public health and medical needs of his state. Had his program of 1920 been adopted in New York State and carried out in the several communities, we should have today no such serious problems in medical care and medical economics as now confront us.—

Health News, New York State Dept. of Health, 12, 19 (May 13), 1935.

PERSONALS

GEORGE S. KELLEY, of New York, was awarded a certificate of merit "for reducing the dangers of silicosis, the dust hazard," at the Franklin Institute Meeting held in Philadelphia on May 16.

DR. DOYLE W. FULMER, of Little Rock, Ark., has been appointed Director of the Saline County Health Unit, succeeding Dr. Cad A. Henry, resigned.

LAWRENCE JACKSON SMITH, M.D., of Apponaug, R. I., is the newly appointed Health Officer of Springfield, Mass. It is announced that Springfield's health department will now be supervised by a public health council, in place of the former board of health.

DR. EDWIN HENRY SCHORER, of Kansas City, Mo., member A.P.H.A., has been appointed Health Commissioner of Kansas City, succeeding the late Jabez N. Jackson.

ALBERT GRANT FLEMING, M.D., of Montreal, Que., Life Member A.P.H.A., has been appointed secretary to the Health Insurance Committee of the British Columbia College of Physicians and Surgeons.

DR. JAMES H. SHRADER, F.A.P.H.A., formerly with the Research Laboratories of National Dairy Products Corporation, Inc., Baltimore, Md., has been transferred to the Sealtest

System Laboratories, Inc., with offices at 120 Broadway, New York. DR. ANNE L. BRADY has been appointed City Health Officer of Ross, Calif., to succeed Dr. George H. Willcutt. DR. CLARENCE E. SIMONDS has been appointed Health Officer of Windham, Conn., succeeding the late Dr. Frederick E. Wilcox.

DEATHS

DR. REUBEN HAYES IRISH, of Troy, N. Y., medical diagnostician and tuberculosis specialist, died of a heart attack April 30, while engaged in clinical work at a public school. He was a member of the board of managers of Pawling Sanitarium and of the staffs of the Leonard and Samaritan Hospitals, of Troy.

DR. JOSEPH HENSCHEL, president of the Bronx Borough Medical Society and a trustee of the New York Physical Therapy Society, died May 1 while delivering a lecture on physical therapy at the New York Academy of Medicine. He was a director of physical therapy at the Bronx Hospital and at St. Elizabeth's Hospital, of New York.

WILLIAM FOWKE RAVENEL PHILLIPS, of Washington, D. C., died February 16.

CONFERENCES

June 2-6, American Federation of Organizations for the Hard of Hearing, Cincinnati, Ohio.

June 3-5, Twenty-Fourth Annual Meeting, Canadian Public Health Association, in conjunction with the Ontario Health Officers' Association, Canadian Tuberculosis Association, and Canadian Social Hygiene Council. Royal York Hotel, Toronto.

June 4-9, Annual Meeting, Royal Institute of Health, Harrogate, England.

June 7, 8, American Academy of Pediatrics, New York, N. Y.

June 9-11, Medical Women's National Association, Atlantic City, N. J.

June 9-15, National Conference of Social Work, Montreal, Canada.

June 10, 11, American Association of Medical Milk Commissions, Atlantic City, N. J.

June 10-14, Annual Meeting of the American Medical Association, Atlantic City, N. J.

June 11, American Heart Association, Atlantic City, N. J.

June 12, 13, Annual Meeting, Academy of Physical Medicine, Atlantic City, N. J.

June 14, 15, Conference of State and Provincial Health Authorities of North America, Atlantic City, N. J.

June 17, 18, State and Territorial Health Officers, Washington, D. C.

June 17-19, Medical Library Association, Rochester, N. Y.

June 17-19, Ninth Annual Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.

June 17-19, Semi-Annual Meeting, American Society of Heating and Ventilating Engineers, Royal York Hotel, Toronto, Ont., Can.

June 19-22, Eighth Health Education Conference of the American Child Health Association, Iowa City, Iowa.

June 23-26, International Congress on Housing, Prague, Czechoslovakia.

June 24-26, Ninth Annual Conference of the Pennsylvania Sewage Works Association, State College, Pa.

June 24-27, Annual Meeting of the National Tuberculosis Association, Saranac Lake, N. Y.

June 24-29, Summer Meeting of the American Association for the Advancement of Science and Associated Societies, Minneapolis, Minn.

June 30-July 5, National Education Association, Denver, Colo.

July 1-3, Annual Meeting of the Montana State Medical Association, in conjunction with Sixth Annual Meet-

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

July, 1935

Number 7

Significant Aspects of a Recent Official Survey Concerning the Household Use of Milk in Philadelphia

SENECA EGBERT, M.D., F.A.P.H.A.

*Professor Emeritus of Hygiene and Sanitation, University of Pennsylvania,
Philadelphia, Pa.*

A COMPREHENSIVE study of the household consumption of fluid milk and other dairy products in Philadelphia and its vicinity was made during the summer of 1934 by the Department of Agricultural Economics of the Pennsylvania State College and the U. S. Department of Agriculture. In the same area similar surveys were made in 1924 and 1929.

The field work was done from June 11 to 28, during which time 21 enumerators—college students in economics—obtained direct records from 3,004 families residing in the city, and from 409 in the suburbs. In the city the families lived in 149 separate areas throughout the city. Approximately every 12th home in each area was visited.

The areas from which approximately every 12th family was selected for this survey were the same as those used as a basis for numerous sociological studies by the Department of Industrial Research of the University of Pennsylvania, and this "sample" of the population "has been very carefully checked

periodically by the university and found to be representative of the city in respect to nationality, income, geographical location, ages, social and other conditions, and contains approximately 36,000 families." Consequently, it is believed to be thoroughly representative of the population of the city as a whole, as are the corresponding suburban selections representative of their respective communities. In other words, the study is as nearly as possible in accord with the population and more important, social characteristics of Philadelphia and its immediate suburbs.

The enumerators used printed blanks, having demonstrated their thorough understanding of them and of a detailed set of instructions, were paid on an hourly basis, and were not required to obtain or submit a stated number of records daily. Also, "in order to check the accuracy of the purchases reported by the consumers, records of actual sales by dealers to these families during the same week were checked against amounts reported by the 1,412 individual families. Checks were also made

to find whether or not the families interviewed were receiving milk from any relief agency."

The data concerning the home consumption of milk, butter, and other dairy products were obtained from housewives in most instances, and the information, except where specifically noted, is given in the report just as it was given to the enumerators by those interviewed. The survey had only to do with the quantity of milk and its products bought for home consumption, and did not consider the amounts used in school lunches, at restaurants, or elsewhere by members of the reporting families, or that used in bakeries, ice cream factories, or in other processes outside the home.

STUDY OF DATA OBTAINED

There was a drop in the daily average use of fluid milk per capita in the home since the survey of 1929, when the average was slightly more than 2/3 pint (0.68), to 6/10 pt., a reduction of over 11 per cent in 5 years. It is unlikely that the decline was as marked as this, even though a lessening in the home use of milk was to be expected because of the "depression." A number of factors in the 2 studies have not remained fixed. The marked exodus from the city to suburbs in recent years, largely made up of the native white, Irish, and North European classes, which, according to the survey, use milk and its products more abundantly than most others, has had an influence in lowering the general average and in increasing the disparity between that of the city and suburban residents.

For those families reporting purchase and use, the average weekly consumption was 10.6 qt. of fluid milk, 2.17 lb. of butter and 1.31 qt. of ice cream—an average per capita consumption weekly of 2.25 qt. of fluid or fresh milk, and a little less than 5 oz. of butter and a little more than 1/2 pt. of ice cream.

These quantities as representative of the weekly *average* per capita use by the public generally would be hard to credit, did we not remember that they only indicate the purchase for *home* use. We learn that but 92.3 per cent of the families interviewed purchased fluid milk, and only 92.7 per cent of them bought butter. Almost one-half of the families bought some condensed or evaporated (canned) milk, and almost 40 per cent purchased ice cream.

Similar information was secured regarding the consumption of buttermilk, cream, canned milk (evaporated and condensed), and cheese, both as to the weekly purchase and the per capita use of each. This information is well analyzed and deserves more extended consideration than can be given here. Any student of dietetics or household economics will find this part of the report of interest and value.

NATIONALITY AND OTHER FACTORS

Of those using fluid milk, the highest weekly average per capita was by the Jewish families (2.56 qt.), closely approximated by the native white and Irish (2.53), and the North European (2.34). The lowest average consumption was by the Negro (1.57) and the Mediterranean (1.81) families, this difference being more marked in the case of the Negroes, since only 87 per cent of their families used any fluid milk at home, as compared with 98 per cent of the Jewish and 95 per cent of the native whites. The Negro and Mediterranean groups also showed the lowest average in the use of canned milk and of butter; but the general and free use of olive oil by the South Europeans doubtless accounts for their low average in the case of butter.

According to the averages, the use of fluid milk in the home increased with the per capita income until the latter is about \$18 per week. As it rose above this there was a slight decline in the

quantity consumed, which may be explained by the tendency of those households with larger incomes to make use of a more varied dietary, and also for some members of the family to take more of their meals away from home. Thus, of the 289 families receiving milk from relief agencies and comprising nearly 8.5 per cent of all interviewed, the average weekly consumption of milk per person was 2.12 qt., which was higher than the purchases by families in the lower income groups who were not on relief.

After the average per capita income of the family became \$10 or \$12 per week the personal use of milk in the home varied from 2.64 to 2.84 qt. per week. In the lower income groups the use of fluid milk was definitely related to the size of the family, the per capita average being decidedly less in the larger families, but when the average individual income was \$10 or more, this relationship between the size of family and per capita consumption was not apparent. Perhaps this was because, as a rule, there are not so many children in the families of the higher income groups, and also the use of milk is not so limited to the younger or privileged members of the household—this latter factor being, irrespective of the general rule that the more children in the home the greater the use of milk.

The use of butter increased with the average income per capita, which had a marked effect upon the amount consumed by the family. This is shown by the difference between 0.32 lb. per person for those with the lowest income and 0.84 lb. for those with the highest. Butter was more largely used by the native white part of the population than by others, but with similar small incomes, there was a decided tendency for the large families to consume less butter per capita than the small ones. As the incomes became larger, however, this tendency was not apparent.

The use of condensed or evaporated milk declined when the average personal income reached \$12 per week and continued to do so until it approximated \$18. Of the reasons given for using condensed or evaporated milk, 37 per cent dealt with the price, 30 per cent with convenience of its use, and 18 per cent with the fact that the user liked "canned milk." Seventy per cent of the families purchasing canned milk used it only in coffee; 7 per cent for cooking, and 23 per cent both in coffee and for cooking. It is significant that among the users of canned milk only 7 per cent purchased cream compared with 23 per cent of the families not using canned milk. There was no large variation in its use among the various nationalities, though the North Europeans and native whites were the largest consumers. The size of income did not affect the purchase of canned milk as much as it did that of butter or fluid milk.

ANALYSIS OF REASONS GIVEN FOR USE OF MILK

Eighteen per cent of the reasons given by adults for drinking milk had to do with its health value, and 5 per cent because of doctors' orders, but 75 per cent of the reasons related to liking it. On the other hand, of the reasons given by adults for not drinking milk, 49 per cent were because of a dislike for it, 33 per cent because it cost too much, and 9 per cent because it was thought to be too fattening.

For children, according to the adults interviewed, 2 per cent of the reasons for their use of milk related to physicians' orders, 34 per cent to its health value, and 62 per cent because it was liked—this, for those using it. About one-half of the reasons given for children not drinking milk was because of dislike for it, and 44 per cent because it cost too much.

Of more interest from the public

health standpoint, it was learned that between 80 and 90 per cent of the children between the ages of 1 and 10 years drank milk regularly; at from 9 to 10 years of age there was a decline; and from 9 to 11 years, apparently there was a decline in the percentage who drank milk habitually and a corresponding increase in the percentage that never drank milk.

Fewer mothers drank milk regularly than did any other adult members of the family, the proportion being 17 per cent of mothers, 23 per cent of the fathers, and 36 per cent of the other adults. Moreover, 58 per cent of the mothers as against 52 per cent of the fathers and 40 per cent of the other adults never drank fluid or fresh milk. This is probably because of the customary self-denial of mothers when funds are limited, and because the average per capita income of the family decidedly influences the milk drinking habits. It is serious, nevertheless, because so much depends upon the mother's maintained health and stamina, not only for her own welfare, but also for the good and safety of the children already here and those yet to be born.

In this connection the following quotations from the report are significant:

Generally speaking, the number of people who regularly drink milk has continued to increase during the last 10 years. With the exception of the Italian families, the children up to 13 years of age showed a decided increase in the number drinking milk over the 1929 study. The most phenomenal increase was among the colored children—30 more in each 100 drinking milk every day than 5 years ago. . . . Compared with 5 years ago, 23 per cent more children in the adolescent stage drank milk regularly, but in the Negro and Italian groups there was a decline in the percentage of children between 13 and 18 years of age who drank milk as compared with 1929. . . . Without exception, in the adult group there were fewer people drinking milk regularly than were reported 5 years ago. . . . It is significant that in the nationalities with the highest average per capita con-

sumption of fluid milk there was a high percentage of people drinking milk regularly. . . . A relationship between publicity and increased milk consumption seems clear, but it cannot be concluded that it is a "cause and effect" relationship. The causal relationship may run from high consumption to knowledge of publicity, rather than from publicity to increased consumption.

The statement that over 23 per cent more of the children in the adolescent stage drink milk regularly now than in 1929 is important, especially as it only refers to milk used at home. This naturally directs our attention to schools, although the influence of mothers' meetings, women's clubs and journals, etc., upon the parents must not be overlooked or ignored.

As for the schools, we find in them today not only a direct teaching of the importance and value of milk in the making of sound and healthy bodies, but also that the school lunch is becoming a feature of constantly increasing moment in the life of the child. Milk is stressed as an important part of that lunch, either in its fluid state or as a part of many of the other foods served that children like and naturally choose without much urging, such as cocoa, junket, ice cream, etc., and this applies to many of the boys and girls above 12 or 13 years of age who are shown to average a lower consumption of milk at home than the younger children, for in getting milk in some form of drink or food at school they may forego or decrease its use at home. An investigation as to the total quantity of fresh milk supplied regularly to the many hundreds of public, parochial, and private schools would be instructive and would doubtless show a considerable increase to be added to the per capita average of milk consumed by the children concerned.

Again, it would be interesting to know how many or what proportion of the older members of the families interviewed, including the youths and older

girls no longer at school, are absent from home for a considerable portion of the day either habitually or so frequently that they average at least 5 or 6 meals weekly taken away from home and not prepared for by the home keeper and family provider. Anyone conversant with the multitude of restaurants, cafeterias, etc., in the business sections of a city must marvel at the great quantity of foods necessary to supply the need, among which milk forms a component and considerable part. This, if it could be determined or even approximately estimated, would doubtless increase the per capita average in those families reporting adults or others who never drink milk at home.

Furthermore, the large quantities of fresh milk that are used in bread and cake bakeries, and candy factories, and in the preparation of many kinds of marketed foods need only be mentioned to indicate that, thorough and excellent as the survey in question has been as to the home use of milk, the latter demand is only one of several factors that influence the size of the stream that must unflinching flow in full quantity and unimpaired quality to supply the daily needs of a great community. It would be desirable that a future study, equally thorough in its method, be made of the consumption outside of the home. It is because of this inquiry into and subsequent concentration upon the home use of the milk that the city's daily supply may be and probably will be brought back to what it was a few years ago, and increased to the larger supply point that is advisable in order adequately to maintain the health and welfare of the community.

An appreciation of the total amount of fluid milk regularly distributed in a metropolitan area such as Philadelphia, may aid in comprehending the magnitude and complexity of the problems incident to a city's milk supply. Five years ago in Philadelphia this amount

exceeded 800,000 qt. daily. In recent years it has been somewhat less than this, but has probably not been less than 700,000 qt. a day at any time. Even at its maximum the amount is entirely inadequate for the city's health needs when apportioned to the population according to the well established and well recognized opinions of the best dietetic authorities. Under the rule of a quart of milk for every child and a pint for every adult each day, the supply would have to be increased to well over a million quarts daily, almost doubling the minimum of any time within the last 5 years.

The attainment of such an ideal may seem visionary, but we should work toward the end especially that the 13 per cent of children under 12 years, the 30 per cent of adolescents between 12 and 18, and the 83 per cent of mothers who only occasionally or never drink milk should have their essential and adequate quota.

CONSUMERS SHOW LACK OF ADEQUATE INFORMATION

Each person interviewed was asked if she knew the difference between Grade A and Grade B milk. The majority of the differences as stated by the consumers dealt with the quality of the product. Of the families interviewed using B milk, 26 per cent did not know the difference between A and B milk, and 9 per cent stated that "there was no difference." Approximately half of the differences reported by the consumers dealt with the fact that A was of higher quality than B. Apparently there is not a clear distinction in the minds of consumers between the various grades of milk sold in the Philadelphia market.

Of special interest is the following:

Each person interviewed was asked how much per quart he or she paid for milk. The purpose of this question was to find if the consumer really knew the unit price of fluid

milk. Approximately 47 per cent of the persons interviewed who purchased grade A milk named the retail price that was set by the Pennsylvania Milk Control Board for the Philadelphia market; 35 per cent named a price other than that set by the board. This may be accounted for in 3 ways: first, the consumer may not have known the grade of milk purchased; second, there may have been price cutting in the market; third, the consumer did not know the price paid for A milk. Approximately 18 per cent of the people interviewed stated specifically that they did not know the price they paid.

Approximately 76 per cent of the consumers purchasing grade B milk stated the price for that grade named by the Pennsylvania Milk Control Board. Approximately 13 per cent named a price other than the retail price fixed by the Board, and the remaining 12 per cent stated specifically that they did not know how much per quart they paid. Over 90 per cent of all the consumers interviewed did not know the retail price of cream. Of those purchasing cream, approximately 70 per cent did not know the price they paid.

Undoubtedly the "depression" has had much to do with and is a major reason for the lessened demand for milk. Many families formerly fairly well-to-do have had to economize to the utmost, and far too many have had to become recipients of outside relief, public or otherwise, but the depression has been blamed for much that has been really due to evasion of personal responsibility and duty, or to careless or shiftless thinking. There could be no better illustration of this than in the 22 per cent decrease in the use of milk which occurred within 2 weeks among over 31,000 of the 44,000 Philadelphia families on relief, when relief methods were changed in November, 1934, from food orders to cash relief. By the following month the decrease in the purchase of fluid milk was as great as 29.6 per cent.

Milk is not the only necessity of which the use has been unduly curtailed, but as regards family and personal health, it is perhaps the most important. Aside from the direct influence of the depression upon the dietaries and nu-

trition of families actually affected by it, the next and most serious factor in causing families and individuals to lessen instead of increase their use of milk and its products as a necessary part of the diet is the propaganda that the cost of milk to the consumer is too high in view of the price paid to the producers.

MUNICIPAL STANDARDS A SAFEGUARD

It will be well to recall and re-state certain matters concerning Philadelphia's milk supply, past and present, although space will not permit a thorough discussion of them and what they have meant in affecting and influencing the health and lives of the population.

In 1913 an ordinance was adopted that required the pasteurization of all fluid milk sold in the city for direct consumption, except that which was produced under such conditions and professional inspection as would justify its sale as "certified" or "inspected raw milk." Since then there have been other ordinances and regulations requiring the periodical inspection by city officials of all pasteurizing and distributing plants, of the sale of milk only from tuberculin tested cows, etc., etc., with the result that of all milk sold in the city for direct use in 1932, 99.53 per cent was pasteurized and less than $\frac{1}{2}$ per cent was sold as "certified" or "inspected raw milk."

In 1912 there were approximately 2,500 milk dealers or distributors in the city; now there are about 90. In that period there were thousands of cases of typhoid fever with over 200 deaths per annum. Even so, the cases and deaths had been much reduced within the preceding 5 years by the completion of the city filters and the supplying of clean water to the whole community. In 1913 the number of deaths from typhoid fever showed a marked increase and the mortality rate from infantile diarrhea was high; hence a pasteurizing

ordinance for milk and subsequent regulations governing its production and care. Since the mortality due to the diseases mentioned, and others of like nature, has progressively decreased until in 1934 there were only 18 deaths from typhoid fever and 146 deaths of children under 1 year from infantile diarrhea in the city, with milk certainly being a very improbable factor in causing any of them, and not a single milk-borne epidemic in Philadelphia since 1916.

To increase the use of milk to a total more nearly adequate for the community will require much persistent effort and the best thought of all concerned in the public welfare and, especially, in the nutrition and welfare of children now and as future citizens.

For a long time to come the best results in developing the extended and greater personal use of milk and its products will probably come from continuous and wisely directed publicity of all legitimate kinds and by all concerned in advancing human welfare. This has been effective in the recent past and throughout the depression, and is shown by the increase in the number of school children regularly drinking milk. Too much credit cannot be given to every organization and agency that has had a part in the splendid educational work already done, and in aiding them and others to continue and increase the efforts they have made. The methods of the city health departments, the American Child Health Association, the Dairy Council and others should have more than passing commendation. Still more

intensive efforts must be made, especially among parents and other adults, to bring home to them that milk is not only an important and healthful food but that it gives value more than any other staple one of similar cost and that it is cheap only in the sense of price.

The following editorial in a recent number of the *Journal of the American Medical Association* indicates that this need is not a local one or peculiar only to Philadelphia and its neighborhood:

The unique importance of milk in the dietary has been fully established by investigators in nutrition during the past 30 years. Largely through the studies of Sherman and his cogent presentation of the results, there has been given to the human requirement for milk a quantitative expression. A quart of milk daily per child has become a by-word with practical workers in nutrition. How does the current per capita consumption compare with this standard or one based on it? Assuming that adults require less milk than children and that other suitable foods can be substituted in part for milk, the *Consumers Guide* states that a minimum-cost diet should provide 260 quarts of milk or its equivalent annually. "What we are actually getting is about 191 quarts per person a year—and this is an average, which means that a lot of people are getting very much less." Similar evidence is provided by the statistics issued by the Department of Agriculture. In 1933 the daily per capita consumption of milk and cream in cities and villages was about 154 quarts. Thus there is considerable discrepancy between the current consumption of milk and what it ought to be according to conservative expert opinion.

REFERENCES

1. *J.A.M.A.*, Sept. 15, 1934.
2. Bureau of Agricultural Economics, U.S.D.A., releases of May 24, 1934.

Culture Media Used for Routine Diphtheria Cultures With a Suggested Modification of Loeffler's Blood Serum Medium*

ROSS L. LAYBOURN, F.A.P.H.A.

Bacteriologist in Charge, Public Health Laboratory, Kansas State Board of Health, Topeka, Kans.

WHILE the range of reaction in which *C. diphtheriae* will grow on artificial culture media is quite wide, the effect of different reactions within this range on luxuriance of growth, morphology, and staining is marked. The following references illustrate these points:

Medalia¹ found that a change of pH 0.4 in the better growth range had a marked influence on the luxuriance of growth of the organism.

There is usually little change in morphology between pH 7.8 and pH 6.4, but beyond this zone decided differences are noticed. The author² has found that many of the Wesbrook types can be produced from a culture which normally shows a predominance of Type C by varying the reaction of the medium. Plates I and II show the same strain grown on medium of pH 7.4 with Wesbrook Type C predominating, and on the same with a pH 6.1 with Types C-2 and D-2 predominating.

Stovall³ reported in 1923 that the morphology and staining characteristics of *C. diphtheriae* in throat cultures con-

taining *S. aureus* were quite different and less typical than the characteristics of the same strain when grown in pure culture. In view of the effect of reaction upon the morphology of this organism, it seemed probable that the variations observed by Stovall might be due to the production of acid by *S. aureus* from the dextrose in Loeffler's blood serum. This assumption was confirmed by a preliminary study of 5 strains of *S. aureus* isolated from throat cultures which changed the reaction of tubes of a modified Loeffler's blood serum from an initial pH of 7.1 to a pH of 6.0 to 5.8 in 18 to 24 hours.

Considerable emphasis is frequently placed on morphology and staining in the examination of diphtheria throat cultures, particularly by inexperienced workers, and it seems desirable that the media used should be of a composition and reaction which would support luxuriant growth and permit the development of what are termed "typical forms" of *C. diphtheriae*, if for no other reason than to facilitate the examination of cultures. Such a medium must either be well buffered and hold the reaction in the vicinity of the optimum for *C. diphtheriae* (pH 7.4-7.6)

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

in the event of considerable acid production by other organisms present, or the fermentable carbohydrate content must be reduced to limit acid production. A study of this problem conducted along these lines has been divided into the following sections: (A) changes in reaction occurring during the storage of uncoagulated serum and serum bouillon mixtures; (B) the effect of reaction upon the appearance and physical properties of coagulated serum; (C) changes in the reaction of serum-bouillon mixtures during sterilization and the buffer effect of different media; (D) the production of acid from coagulated serum media by *S. aureus*; (E) an improved medium for diphtheria throat cultures.

METHODS

Determination of reaction of serum-bouillon mixtures and coagulated serum media—Colorimetric hydrogen ion determination on serum-bouillon mixtures and coagulated serum media presents many difficulties including the accurate comparison of colors in serum, the determination of the reaction of coagulated serum medium, and the protein

and salt-effect errors introduced by the composition of the test substance. A commercial colorimetric hydrogen ion set designed for use with small amounts of biological fluids was used. This employs small glass cells about 10 mm. inside diameter and 5 mm. inside depth, and readings are made on an opal glass plate. The principle of dilution of the specimen with neutral distilled water, suggested by Brown,⁴ was employed to reduce the color of the serum, 1 drop of the test substance being diluted with 5 drops of neutral distilled water. Two drops of the indicator were added to both the test cell and those containing the standard buffer mixtures. Dilution was also found materially to reduce protein and salt-effect errors, and bromthymol blue was found to be the most satisfactory indicator as regards range and protein and salt-effect errors.

Readings on coagulated medium were made on the water of condensation and were found to give quite an accurate index of the reaction of the coagulum.

In establishing the reliability of the method, electrometric determinations were made using the quinhydrone elec-

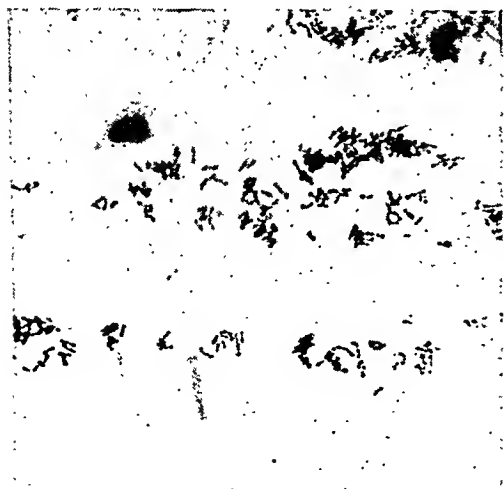


PLATE I—*C. diphtheriae*, culture No. 663, after 18 hours' incubation on Loeffler's medium of an initial reaction of pH 7.4. Granular types predominating.

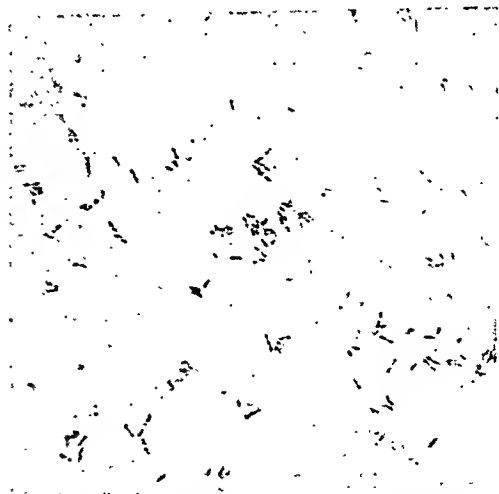


PLATE II—*C. diphtheriae*, culture No. 663, after 18 hours' incubation on Loeffler's medium of an initial reaction of pH 6.1. Solid staining types predominating.

trode designed by Cullen⁵ for determining the reaction of small amount of blood serum. Comparisons were made between the water of condensation and the coagulated medium by pushing the Cullen electrode, less its capillary tube, into the coagulum and connecting to the calomel electrode by means of a salt bridge consisting of a glass tube containing saturated potassium chloride solution in 3 per cent agar which was pushed into the coagulum.

While the colorimetric method used would hardly be termed one of great precision, it was found to be sufficiently accurate for the problem. In most instances the error did not exceed pH 0.1 rarely pH 0.2. The larger errors usually occurred in the extreme range of the indicators.

Sera used—Beef, sheep, horse, hog, and human sera, the latter being the pooled surplus of inactivated Wassermann specimens. All sera used were preserved with chloroform and stored from 1 to 2 weeks.

Formulae used—While trial lots of media were made, eliminating various constituents, the following basic formulae were used in this investigation.

Other formulae were tried in which the proportion of serum was increased to 90 per cent. Lots of media were also made up with a content of peptone, dipotassium phosphate and other substances approximating the concentrations used in infusion media. Such formulae were found to be too concentrated for luxuriant growth and are not reported in this paper.

Stains used—Loeffler's alkaline methylene blue and the author's⁶ diphtheria stain have been used in these studies.

CHANGES OCCURRING IN SERUM AND SERUM-BOUILLON MIXTURES DURING STORAGE

The practice of obtaining serum in large quantities and preserving it with

chloroform until needed is followed in some laboratories which use large quantities of Loeffler's blood serum. While bacterial action is inhibited by the chloroform, it does not entirely arrest enzyme action. Changes take place rather slowly but when serum so preserved is stored at room temperature from 2 to 6 weeks, considerable change in reaction will frequently be observed. Beef sera preserved in this manner and stored for considerable lengths of time have been found to give reactions varying from pH 6.2 to pH 7.4. The drift in reaction during storage is usually toward an increased acidity. Because of this fact, a formula which calls for the use of a certain serum to which a fixed amount of sodium hydroxide solution is added, cannot always be expected to give uniform results when made with preserved serum.

BASIC FORMULAE USED

Formula I (Loeffler's)

Serum	3 parts
0.5% dextrose, meat extract bouillon	1 part

Formula II

Serum	800 c.c.
Glycerol	40 c.c.
Bouillon concentrate	160 c.c.

Bouillon concentrate

Proteose peptone, Difco	1.25 gm.
Dextrose	3.00 gm.
Dipotassium phosphate	1.25 gm.
Water	160 c.c.

Dissolve with heat.

Formula III

Serum	800 c.c.
Glycerol	40 c.c.
Bouillon concentrate	160 c.c.

Bouillon concentrate

Proteose peptone, Difco	1.25 gm.
Dipotassium phosphate	1.25 gm.
Cystine	0.5 gm.
Water	160 c.c.

Dissolve with heat.

NOTE: Not all the cystine can be dissolved in this amount of water. Undissolved cystine should be in suspension in the concentrate when added to the serum.

THE EFFECT OF CHANGE OF REACTION
UPON THE APPEARANCE AND PHYSICAL
PROPERTIES OF COAGULATED
SERUM MEDIA

The consistency, color, and adherence to the culture tube of coagulated serum media is indicative of the reaction of the medium. Media which are acid in reaction are chalk-white and adhere tenaciously to the tube. Very acid media usually contain irregularly shaped bubbles and crumble under the pressure of the swab during inoculation. The chalk-white media sometimes supplied commercially, while pleasing in appearance, advertises by that appearance that it is too acid for best results.

The addition of sodium hydroxide solution to serum media causes a hydrolysis of the serum which is proportional to the amount of the reagent added and color, transparency, consistency, and adherence to the tube change in proportion to the extent of the hydrolysis. While these manifestations of hydrolysis vary somewhat with the sera of different animals, generally speaking, moderate hydrolysis produces an opaque

cream colored coagulum which adheres well to the tube while more extensive hydrolysis results in soft, mushy, semi-transparent coagulum which is either tan or gray-black in color depending upon the kind of serum used. The first manifestation of hydrolysis which makes a coagulum unsatisfactory for throat cultures, particularly when the medium is shipped or transported, is its failure to adhere firmly to the tube. The reaction at which this occurs varies with the sera of different animals and with other constituents of the medium. With medium made according to the standard Loeffler's formula, the most alkaline final reaction at which different sera give a coagulum which adheres firmly to a grease-free tube is as follows:

Serum	pH
Human	7.6-7.8
Hog	7.3-7.5
Horse	7.3-7.4
Sheep	7.1-7.2
Beef	6.7-6.8

The reaction of a coagulated serum medium should be in the vicinity of the optimum for the growth of *C. diphtheriae*, and at the same time, the smallest possible amount of sodium hydroxide solution should be added to avoid excessive hydrolysis. Human and hog serum are, therefore, best adapted to use in the media used for diphtheria cultures. These two sera also give a firmer coagulum at all reactions than horse, sheep, and beef sera.

CHANGES IN THE REACTION OF SERUM-
BOUILLON MEDIUM DURING
STERILIZATION

When the adjustment of the reaction of a serum-bouillon medium has not been attempted, there is no appreciable change in reaction during sterilization, but when the reaction has been adjusted there is a drift of pH 0.1-0.6 toward the original unadjusted reaction on both the acid and alkaline sides during sterilization. The drift is not

CHART I

CHANGE IN REACTION
DURING STERILIZATION

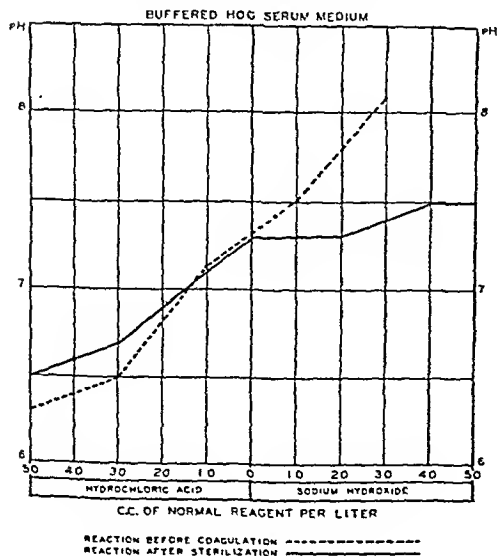


TABLE I
pH CHANGES IN SERUM MEDIA DURING STERILIZATION

Serum		Beef				Sheep				Horse				Hog				Human			
Formula		Loeffler's				Buffered				Loeffler's				Buffered				Loeffler's			
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
C. C. Per L. Normal																					
NAOH	50	—	7.5 ^a	7.7	7.4 ^a	—	8.0 ^a	—	7.7 ^a	—	8.2 ^a	—	7.8 ^a	—	7.5 ^a	—	8.1 ^a	—	7.7 ^a	—	7.7 ^a
	40	—	7.3 ^a	7.3	7.1 ^c	—	7.7 ^a	—	7.5 ^a	—	8.1 ^a	—	7.6 ^a	—	7.5 ^a	—	8.0 ^a	—	7.6 ^a	—	7.6 ^a
	30	8.1	7.3 ^a	7.1	7.1 ^c	7.6	7.5 ^a	8.1	7.5 ^a	8.2	7.8	7.5	7.5 ^a	8.1	7.4 ^c	8.6	7.9 ^a	8.0	7.5 ^a	8.0	7.5 ^a
	20	7.7	7.1 ^a	7.0	6.9	7.4	7.5	7.4	7.5	7.8	7.7	7.4	7.5	7.8	7.3	8.2	7.6	7.8	7.4	7.8	7.4
	10	7.3	7.0	6.9	6.9	7.1	7.3	7.3	7.3	7.5	7.4	7.4	7.4	7.5	7.3	7.9	7.5	7.6	7.3	7.6	7.3
0	0	6.8	6.8	6.7	6.6	6.7	6.9	7.1	7.3	7.0	7.3	7.1	7.3	7.1	7.3	7.5	7.5	7.3	7.3	7.5	7.3
	10	6.5	6.5	6.5	6.5	6.6	6.7	6.9	7.1	6.6	7.2	7.1	7.3	7.1	7.1	7.1	7.3	7.0	7.1	7.1	7.1
	20	6.2	6.3	6.3	6.2	6.4	6.5	6.7	7.0	6.4	7.1	6.8	6.9	6.7	6.9	6.7	6.9	6.5	6.9	6.5	6.9
	30	5.9	6.0	6.0	6.1	6.2	6.4	6.5	6.9	6.2	6.7	6.6	6.7	6.5	6.7	6.3	6.7	6.4	6.7	6.3	6.8
	40	5.7	5.8	5.8	5.8	6.8	6.3	6.3	6.7	6.0	6.3	6.1	6.5	6.4	6.5	6.0	6.5	6.3	6.7	6.0	6.7
	50	5.4	5.5	5.5	5.6	5.8	5.9	6.1	6.5	5.6	6.1	5.8	6.3	6.3	6.5	5.8	6.2	5.8	6.2	5.8	6.5

^a = Unsatisfactory Consistency

so great in buffered media (Formulae II and III) as it is in Loeffler's medium (Formula I), but it is large enough to require experimentation and checks on the finished product in order to be assured that it has the final reaction desired. Table I gives the reaction of lots of media made from the various kinds of sera used before and after sterilization and the drift in reaction of buffered hog serum medium is presented graphically in Chart I.

The effect of buffering is apparent from a study of Table I. While the final reaction of buffered media of satisfactory consistency does not always approach the optimum reaction of *C. diphtheriae* as closely as that of Loeffler's medium, it is well within the range of typical growth and considerably more acid production is required to change the reaction to the point where the morphology of the organism is noticeably influenced, than is required to produce the same effect in standard Loeffler's medium.

PRODUCTION OF ACID IN COAGULATED SERUM MEDIA BY *S. AUREUS*

In studying the production of acid by *S. aureus* lots of hog serum medium having a reaction of pH 7.2 after sterilization were prepared, according to Loeffler's formula, which contained respectively 0.25 per cent and 0.125 per cent and no dextrose (these amounts of dextrose being the quantity present in the mixture when 1 per cent and 0.5 per cent dextrose, meat extract bouillon are used). Five strains of *S. aureus*, isolated from throat cultures, were grown on 5 or more tubes of each lot of medium and the reaction determined after 18 to 24 hours' incubation. Medium containing 0.25 per cent dextrose had a reaction of pH 5.8, the lot containing 0.125 per cent dextrose of pH 6.0, while that with no dextrose has a reaction of pH 6.6, indicating that the changes in reaction occurring

during the growth of *S. aureus* bear a relation to the amount of dextrose in the medium. The change which took place in the medium to which no dextrose was added may be accounted for by the presence of fermentable carbohydrate in the serum. Since this change is relatively small it may be expected that buffering will reduce it still further.

In connection with the production of acid in diphtheria throat cultures, it is worthy of note that members of the colon group are found with considerable frequency and a few checks made indicate that the change in reaction brought about by this group is even more marked than that produced by *S. aureus*.

IMPROVED MEDIA FOR DIPHTHERIA THROAT CULTURES

C. diphtheriae grows so poorly on standard serum medium from which the dextrose has been eliminated that it was necessary to add other nutritive substances in order to secure luxuriant growth.

Glycerol has been reported by a number of workers as increasing the growth of *C. diphtheriae*, and the author has used it since 1919 with excellent results.

Dipotassium phosphate was originally added to the medium for the purpose of increasing the buffer action, and while the unadjusted reaction of medium containing this salt is slightly more alkaline than that of Loeffler's medium, it also contributes to the luxuriance of growth.

Proteose peptone, Difco, has been used in modified formulae because the buffer effect is slightly superior to that of standard peptone.

Gibbs and Rettger⁷ found that the addition of 0.5 per cent cystine to sugar free, veal infusion produced a heavy typical growth, and Braun and Mundel⁸ considered it necessary to the oxidation metabolism of the organism.

They also found the addition of cystine to Loeffler's blood serum stimulated the formation of larger colonies.

Beck⁹ reported that when the diphtheria bacillus is grown in an atmosphere of hydrogen sulphide, growth is stimulated and granule formation is increased. The addition of sodium sulphide (sodium monosulphide) achieves the same result and in the writer's opinion is the most important departure from the standard Loeffler's formula incorporated in this report.

The following formula, incorporating these substances gives a more typical and more luxuriant growth of *C. diphtheriae* in mixed throat cultures than Loeffler's blood serum.

Hog or human serum.....	800 c.c.
Glycerol	40 c.c.
Sodium sulphide (sodium monosulphide) dissolved in 10 c.c. of cold water.....	1.50 gm.
Bouillon concentrate	160 c.c.
Bouillon concentrate	
Proteose peptone	1.25 gm.
Dipotassium phosphate	1.25 gm.
Cystine	0.5 gm.
Water	160 c.c.

Dissolve with heat.

NOTE: Not all the cystine will be dissolved in this amount of water. The undissolved portion should be in suspension in the concentrate when it is added to the serum.

When hog serum is used the reaction of the mixture should be adjusted to approximately pH 7.6-7.7 before coagulation. This requires from 5 to 10 c.c. of normal sodium hydroxide solution per liter of the mixture and the sterilized medium will have a final reaction of about pH 7.3. No adjustment of the reaction is necessary in well preserved human serum, obtained by pooling the surplus serum from inactivated Wassermann specimens, which has been stored in a refrigerator. Medium made according to this formula is tan in color, of a firm consistency and adheres well to the culture tube.

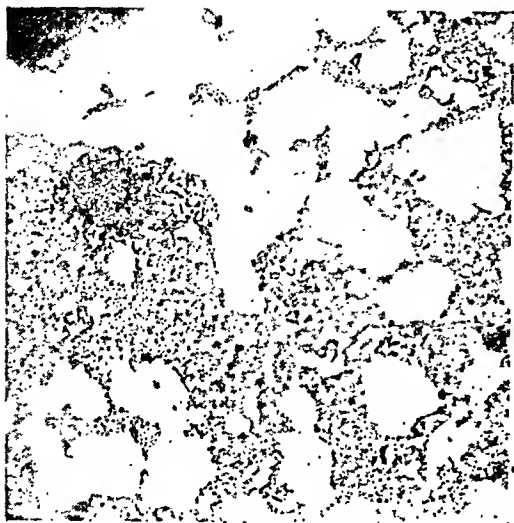


PLATE III—*C. diphtheriae*, culture No. 667, and *S. aureus*, culture No. 1341, after 18 hours' incubation on buffered serum to which no dextrose had been added. Initial reaction of the medium pH 7.3. Reaction after 18 hours' growth pH 6.9. Granular types predominating.

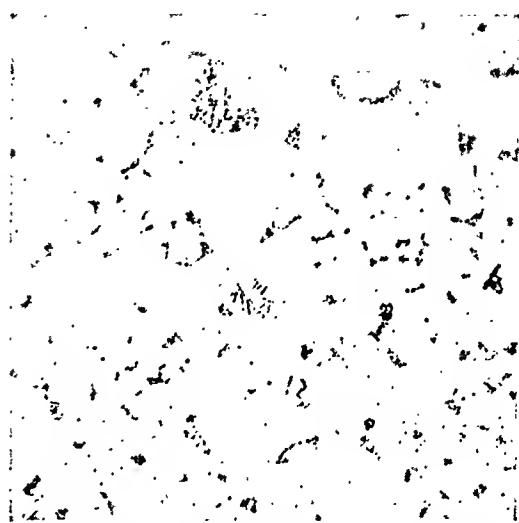


PLATE IV—*C. diphtheriae*, culture No. 667, and *S. aureus*, culture No. 1341, after 18 hours' incubation on Loeffler's medium. Initial reaction of medium pH 7.3. Reaction after 18 hours' growth pH 5.8. Solid staining types predominating.

The use of other kinds of sera than those specified will give a product superior to a similar Loeffler's medium, but the reaction cannot be made as alkaline as hog serum medium due to the production of a coagulum of unsatisfactory consistency.

S. aureus growing on hog serum medium, prepared as above, changes the reaction from pH 7.3 to pH 6.9 during 18 to 24 hours' incubation, as compared to pH 5.8–6.0 on Loeffler's medium. This is well within the zone of reaction in which *C. diphtheriae* grows luxuriantly with typical morphology and staining, and comparisons made with mixed cultures of *S. aureus* and *C. diphtheriae* on this medium and on Loeffler's hog serum having a reaction of pH 7.3 show marked differences in morphology and staining. These are illustrated in Plates III and IV, in which the 2 media were inoculated with the same strains of *S. aureus* and *C. diphtheriae* and incubated for 18 hours. Growth on Loeffler's hog serum medium was not so luxuriant as on the buffered medium and the diphtheria bacillus

showed a predominance of solid staining forms while on the buffered medium Wesbrook's Type C predominated.

SUMMARY

1. Changes in reaction occur during the storage of blood serum preserved with chloroform which influences the reaction of coagulated serum media in which such serum is used.

2. The color and consistency of serum-bouillon media are indicative of the reaction. The addition of sodium hydroxide solution to serum-bouillon mixtures causes a hydrolysis which, if extensive, makes the consistency of the coagulum unsatisfactory for use. Human and hog sera require the use of less alkali in the adjustment of the reaction than beef, sheep, and horse sera, and are preferable for this reason. Beef, sheep, and horse sera form a softer coagulum than human and hog sera which also makes them less satisfactory for use in throat culture media.

3. The reaction of bouillon-serum mixtures changes during coagulation and sterilization, and allowance must

be made for drift of reaction in adjusting the uncoagulated mixture.

4. *S. aureus* produces sufficient acid from the dextrose in Loeffler's medium in 18 hours to influence greatly the luxuriance of growth, morphology, and staining of *C. diphtheriae*.

5. A formula for diphtheria culture medium is suggested which supports luxuriant growth of *C. diphtheriae* with typical forms of the organism in the presence of *S. aureus*.

REFERENCES

1. Medalia, Leon S., Bailey, Karl R., and Atwood, Catharine. *J. Bact.*, XXI:119, 1931.
2. Laybourn, Ross L. *Abst. Bact.*, 5:14, 1921.
3. Stovall, W. D., Scheid, E., and Nichols, M. Starr. *A.J.P.H.*, 13:748, 1923.
4. Brown, J. Howard. *J. Bact.*, VI:555, 1921.
5. Cullen, G. E., and Bilman, E. *J. Biol. Chem.*, 64:727, 1925.
6. Cullen, G. E., and Earle, I. P. *J. Biol. Chem.*, 76:565, 1928.
7. Laybourn, Ross L. *J.A.M.A.*, 83:121, 1924.
8. Gibbs, C. S., and Rettger, L. F. *J. Immunol.*, 13:323, 1927.
9. Braun, H., and Mundel, F. *Centralbl. j. Bakteriologie*, 103:182, 1927.
10. Beck, A. *Centralbl. j. Bakteriologie*, 1 Abt. Orig., 130:287, 1933.

A Federal Hospital for Drug Addicts

THE United States Narcotic Farm at Lexington, Ky., was dedicated the end of May, and opened its doors to narcotic addicts now incarcerated in the various federal prisons. Eventually plans call for the admittance of citizens addicted to the drug habit who voluntarily wish to avail themselves of the newest scientific treatments.

The institution at Lexington is designed primarily for the care of the more intractable type of person, largely the prisoner type. For that reason, the custodial features have been emphasized. The second institution, which will be located at Fort Worth, Tex., will be more open in character, being designed as a cottage type, and the custodial features will be less emphasized.

The main building of the Lexington narcotic farm will accommodate 1,000 persons. In addition there will be quarters for the 250 people required to

operate the institution with an annual pay roll of approximately \$340,000.

Structures on the farm include a complete dairy, poultry house, greenhouse, abattoir, root cellar, and other buildings necessary for the operation of farm activities.

Shops have been established to afford occupation, vocational training and education. Experiments are to be carried out in laboratories to determine the best methods of treatment and research in this field and the results disseminated to the medical profession and the general public. . . . In the laboratories of the Public Health Service, researches are now being made to determine which particular part of opium probably will not cause addiction but will give the beneficial results of opium.—*The United States News*, May 27, 1935.

An Outbreak of Milk-Borne Hemolytic Streptococcic Infection

ARTHUR W. NEWITT, M.D., JEAN W. GLASSEN,
AND R. W. PRYER, DR.P.H., F.A.P.H.A.

Michigan Department of Health, Lansing, Mich.

DURING September, 1934, the attention of the Michigan Department of Health was called to a large number of cases of severe sore throat in the village of Petersburg, a residential and farming community in the west-central part of Monroe County, with a population of about 700.

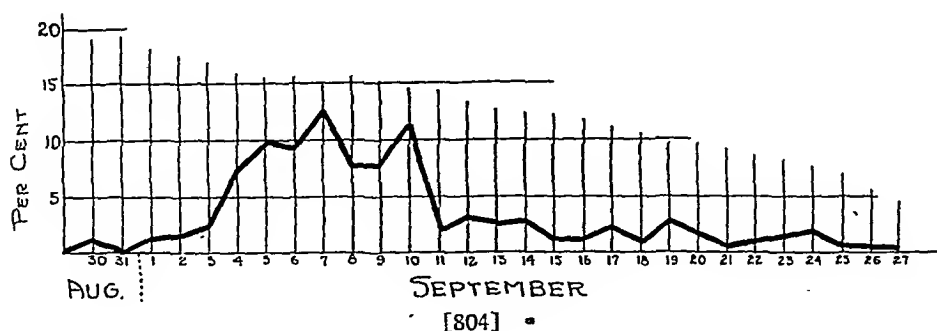
A number of cases were visited and the similarity of symptoms was strikingly evident. The typical case appeared acutely ill. The face was flushed and the eyes were watery and slightly injected. The mucous membrane of the mouth was red, and the tonsils, soft palate, and uvula were injected and edematous. The anterior and posterior cervical lymph nodes were considerably swollen with usually more enlargement on one side. Several patients had so much swelling of the neck that the muscles were rigid and any movement caused severe pain. Attending physicians reported that frequently the swelling would subside on one side only

to appear on the other. Some of the patients had a skin eruption which resembled that of scarlet fever, but was darker, blotchy, and unevenly distributed. The disease more nearly resembled septic sore throat than scarlet fever.

Milk consumed in Petersburg was supplied by one dairy (hereinafter designated "G" dairy), and by a number of persons owning one or two cows. None of the milk was pasteurized. All patients visited were users of "G" milk. A hasty survey of 20 families where "G" milk was not used disclosed no cases of sore throat.

Samples of milk were collected from each cow at the "G" dairy, each sample being a pooled specimen from the four quarters. There were 18 milking cows in the herd. These milk samples, together with throat swabs from patients ill with the disease, were immediately sent to the Michigan Department of Health Laboratory for culture.

FIGURE I—Percentage of Cases by Date of Onset



After 18 hours the laboratory reported the presence of hemolytic streptococci in the milk obtained from cow No. 7. (This cow had been purchased about 2 months before the outbreak.) It was decided on the strength of the evidence at hand, to order "G" dairy to cease distribution of milk until further notice. This order was issued on the afternoon of September 15. The president of the village made arrangements with an out-of-town distributor to supply the people with pasteurized milk, beginning September 16.

FIGURE II—Percentage of Cases by Date of Onset—Cumulative Curve

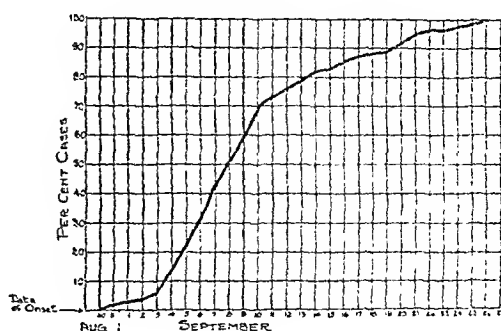


TABLE I

DISTRIBUTION OF CASES BY MILK SUPPLY
ACCORDING TO DATE OF ONSET

Date of Onset	Exclusive Users of "G" Milk	Regular Users of "G" Milk	Occasional Users of "G" Milk	Exclusive Users of Other Milk	Total	Per Cent
Aug. 30				2	2	1.1
Aug. 31						0.0
Sept. 1	2				2	1.1
Sept. 2	2			1	3	1.6
Sept. 3	4				4	2.2
Sept. 4	8	4	2		14	7.5
Sept. 5	16	2			18	9.7
Sept. 6	13	2	1	1	17	9.1
Sept. 7	18	3	2	1	24	12.9
Sept. 8	11	1	2		14	7.5
Sept. 9	9	2	1	2	14	7.5
Sept. 10	17	2	1	1	21	11.3
Sept. 11	4				4	2.2
Sept. 12	4	1	1		6	3.2
Sept. 13	4		1		5	2.7
Sept. 14	3	1	2		6	3.2
Sept. 15	3				3	1.6
Sept. 16	1	2			3	1.6
Sept. 17	3		1	1	5	2.7
Sept. 18	1	1			2	1.1
Sept. 19	6				6	3.2
Sept. 20	2		1	1	4	2.2
Sept. 21			1		1	0.5
Sept. 22	2				2	1.1
Sept. 23						0.0
Sept. 24	3			1	4	2.2
Sept. 25	1				1	0.5
Sept. 26	1				1	0.5
Total	138	21	16	11	186	100.0

TABLE II
COMPARISON OF CASES AND NON-CASES BY MILK SUPPLY

Milk Supply	Cases		Non-Cases		Total	
	Number	Per Cent	Number	Per Cent	Number	Attack Rate
Exclusively "G" milk.....	138	74.2	220	47.4	358	38.5
Regularly "G" milk.....	21	11.3	38	8.2	59	35.6
Occasionally "G" milk....	16	8.6	58	12.5	74	21.6
Exclusively other milk.....	11	5.9	148	31.9	159	6.9
Total	186	100.0	464	100.0	650	28.6

On September 17 the investigation was resumed. A veterinarian from the State Department of Agriculture examined the herd and, without previous knowledge of the laboratory report, made a diagnosis of mastitis in cow No. 7. Separate specimens of milk were then taken from each quarter of this cow for further bacteriologic examination. The cow was killed and the udder sent to the laboratory. The milk from the right front quarter was grossly pathologic.

On September 24 the Monroe County nurse with the cooperation of the village officials began a house-to-house survey of the entire village to collect

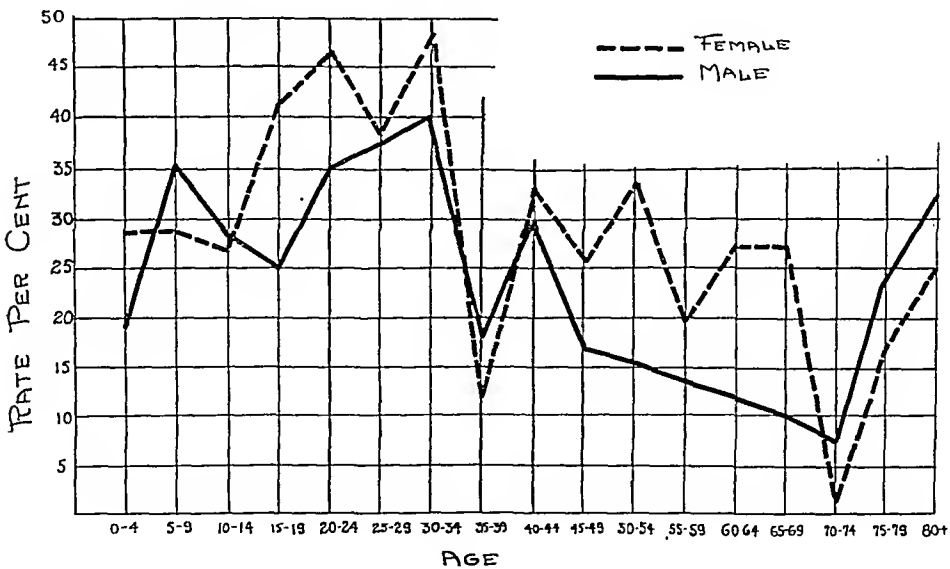
the necessary data for a comprehensive epidemiologic study.*

EPIDEMIOLOGY

Analysis of the data obtained in the survey shows that of 650 persons whose histories were obtained, 186 (28.6 per cent) had had sore throat between August 28 and September 26. Referring to Figures I and II, it may be seen that the 8 day period, September 3 to 10, was the time of greatest incidence, in spite of the fact that distribution of milk from "G" dairy was

* The authors gratefully acknowledge the valuable service of Catherine Connelly in making the survey to obtain epidemiologic data.

FIGURE III—Attack Rate According to 5 Year Age Groups



not discontinued until September 15. The possibility of the milk conveying the infection was early suspected by physicians and some of the people in the village, and for some time previous to September 15 an unknown number had been boiling the milk before use. Other families had discontinued the "G" milk and were buying elsewhere. Just how much these changes affected the outbreak could not be determined. However, it would seem that the majority of the population using "G" milk (133 or 71.5 per cent by September 10) was infected within a few days; indicating that they were exposed almost simultaneously to a purveyor of infection common to all.

The distribution of cases by milk supply according to date of onset is given in Table I. The distribution of cases indicates that users of "G" milk were more likely to be attacked. However, it should be borne in mind that "G" dairy was the only concern seri-

ously engaged in supplying milk in the village.

Table II shows a comparison of cases and non-cases by milk supply. It is quite evident that the attack rate (38.5 per cent) among those persons using "G" milk exclusively, is much higher than the attack rate (6.9 per cent) among those persons who obtained their milk exclusively from some other source. The difference in these attack rates is statistically significant and shows almost positively that the milk from "G" dairy must have been responsible for the infection. The responsibility of this milk is also indicated by the downward trend of the attack rates according to the probability of exposure to "G" milk.

Secondary cases were few, judging from the limited duration of the outbreak. In this respect the outbreak conforms to the findings in other milk-borne outbreaks of streptococcic infection reported.

TABLE III

ATTACK RATE ACCORDING TO SEX IN FIVE YEAR AGE GROUPS

Age	Males			Females			Total		
	Pop.	Cases	Rate Per Cent	Pop.	Cases	Rate Per Cent	Pop.	Cases	Rate Per Cent
0-4....	21	4	19.0	28	8	28.6	49	12	24.5
5-9....	42	15	35.9	28	8	28.6	70	23	32.8
10-14....	29	8	27.6	34	9	26.4	63	17	25.4
15-19....	24	6	25.0	24	10	41.2	48	16	33.3
20-24....	17	6	35.3	26	12	46.1	43	18	41.8
25-29....	30	11	36.6	27	10	37.0	57	21	36.8
30-34....	25	10	40.0	29	14	48.3	54	24	44.4
35-39....	24	4	16.6	17	2	11.8	41	6	14.6
40-44....	13	4	30.7	15	5	33.3	28	9	32.1
45-49....	12	2	16.6	20	5	25.0	32	7	21.8
50-54....	13	2	15.4	21	7	33.3	34	9	26.4
55-59....	15	2	13.3	16	3	18.7	31	5	16.1
60-64....	16	2	12.5	15	4	26.6	31	6	19.3
65-69....	10	1	10.0	15	4	26.6	25	5	20.0
70-74....	14	1	7.1	5	0	0.0	19	1	5.2
75-79....	8	2	25.0	6	1	16.6	14	3	21.4
80-84....	3	1	33.3	4	1	25.0	7	2	28.5
85-89....	2	1	50.0	1	0	0.0	3	1	33.3
90+....	1	1	100.0	0	0	0.0	1	1	100.0
Total..	319	83	26.0	331	103	31.1	650	186	28.6

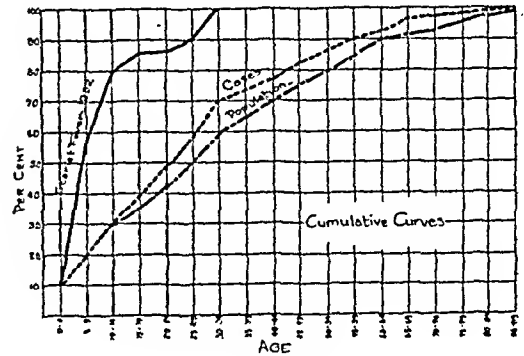
Table III is a tabulation of the attack rates according to sex by 5 year age groups. This is graphically shown in Figure III. The attack rate was slightly higher for females than for males, but not significantly so.

A comparison of curves representing the cumulative percentage age distribution of the cases and of the general population is shown in Figure IV. It is evident that the infection showed little selectivity for any specific age group. This observation is emphasized by comparison with the typical age distribution of scarlet fever.

A remarkable feature of the outbreak was the complication of erysipelas which occurred in 5 cases. All had used "G" milk and had the typical symptoms associated with the outbreak. The erysipelas occurred as they were recovering from the throat infection. Two of the cases of erysipelas had had previous attacks. Cross-infection with other erysipelas cases could be almost positively ruled out for the following reasons: (1) All cases occurred in separate households. (2) Each patient had been ill and confined to the house for several days prior to the onset of erysipelas. (3) Two physicians were in attendance on the cases.

Information as to the presence of rash accompanying the sore throat was available for 169 cases. Of these, 49, or 29 per cent, had a skin eruption. It is interesting to note that in a similar

FIGURE IV—Percentage Age Distribution of the Population and Cases of Sore Throat in Petersburg—Also Scarlet Fever Cases in 1932 in Rural Monroe County



outbreak which occurred in Sweden in 1933,¹ 32.4 per cent of the cases had "scarlatina," the remainder had a more or less severe angina.

The toxin produced by the hemolytic streptococcus isolated from the milk and udder and from the throats of patients was neutralized by standard scarlet fever antitoxin. The question arose as to whether or not persons who had had the infection developed immunity to scarlet fever or Dick toxin. Three months after the outbreak, 126 persons were Dick tested. There were 65 persons tested who had had sore throat and of these 54, or 83.1 per cent, were negative. In the control group there were 61 tested of whom 43, or 70.5 per cent, were negative.

In Table IV is a comparison of Dick tests in cases and controls by age

TABLE IV
REACTIONS TO THE DICK TEST

Persons Who Had Sore Throat During the Outbreak				Control Group		
Age	Number Tested	Dick Test Result		Number Tested	Dick Test Result	
		Number Negative	Per Cent Negative		Number Negative	Per Cent Negative
0-9.....	19	14	73.7	13	7	53.8
10-19.....	18	14	77.7	27	17	63.0
Total.....	37	28	75.7	40	24	60.0

groups. All persons who had had scarlet fever previously were eliminated.

Apparently those persons who had had sore throat, had in general the advantage of a higher grade of immunity to Dick toxin than did those in the control group. Nevertheless, the proportion of immunes is considerably less than the 90 per cent found among persons who have recovered from scarlet fever.^{2, 3} Another observation was that of 23 persons who had a scarlatinaform rash when ill with the streptococcic throat infection, 5, or 22 per cent, had a positive reaction to the Dick test. In contrast, of 21 persons who had had scarlet fever before the outbreak, only 1, or 4.8 per cent, showed a positive reaction. (This positive reactor had sore throat during the outbreak.)

Six deaths could be definitely attributed to hemolytic streptococcic infection, a fatality rate of 3.2 per cent. All deaths occurred in persons over 50 years of age, of whom 5 were males and 1 female. Two died from the complication of erysipelas and all were in an impaired state of health prior to the time they acquired the infection.

BACTERIOLOGY

Milk and Udder Cultures—On September 14, 18 specimens of milk from individual cows in "G" dairy were sent to the laboratory. Poured sheep's blood agar plates were made and the cultures examined after 24 and 48 hours' incubation at 37.5° C. Only one of the cultures, the pooled specimen from cow No. 7, showed hemolytic streptococci.

Additional samples from each of the quarters of cow No. 7 were examined. The milk from the right front quarter was yellow and contained some clots. Hemolytic streptococci were recovered from the milk from this quarter only. On September 18 the cow was killed and the udder examined in the laboratory on the same day. The udder was

apparently normal upon surface examination, except for a lump near the base of the teat of the right front quarter. This lump showed some fluctuation on palpation. Each of the quarters was incised and specimens of material were collected aseptically from the lactiferous sinuses. The glandular tissue of the right front quarter was deep yellow. The fluid in the sinus was purulent and contained clots. Sedimentation took place rapidly on standing in a test tube. Smears from the fluid showed many pus cells. Only that culture made from the right front quarter showed hemolytic streptococci.

Throat Cultures—The first throat swabs, 9 in number, were brought to the laboratory on September 14. No hemolytic streptococci were found. On September 15, 22 swabs were received, none of which showed hemolytic streptococci. The routine method of this laboratory was used, namely, each swab was rubbed over a portion of the surface of a sheep's blood agar plate and the culture allowed to incubate over night.

The observation that many colonies had developed from the milk cultures below the surface of the blood agar indicated that perhaps the organism we were seeking grew best at a reduced oxygen tension. It was decided, therefore, to use poured blood agar plates for culturing the remainder of the throat specimens.

On September 18, 46 throat swabs were received. Surface plate cultures were first made. The swabs were then placed in 1 c.c. of dextrose broth and incubated at 37.5° C. for ½ hour. The broth cultures were then mixed with melted blood agar, and pour plates made. Both surface and pour plates were examined after 24 and 48 hours' incubation at 37.5° C. Seven cultures showed hemolytic streptococci in the pour plates, 2 of which showed colonies on the surface also. Two of the cul-

tures were subsequently lost through failure to grow in sub-cultures.

A tabulation of fermentation reactions and other characteristics is given in Table V. All of the cultures isolated except throat culture No. 15, which was not a true beta hemolytic streptococcus, are classified as being of human origin. Fermentation of trehalose but not sorbitol, low acidity in dextrose broth, and lack of hydrolysis of sodium hippurate were used as criteria.

Throat cultures Nos. 13 and 31 corresponded in all respects to those recovered from cow No. 7, except for differences in growth characteristics. The cultures recovered from the milk were always difficult to grow on the surface of blood agar plates while those recovered from the throats grew well after the second or third sub-culture. Difficulty was also encountered in obtaining growth in carbohydrate broths of organisms recovered from the milk, heavy inoculations being necessary.

All cultures were carefully examined for capsules and mucoid colonies, characteristics of *Streptococcus epidemicus*

originally described by Davis⁴ and regarded as the specific causative organism in septic sore throat by Frost *et al.*⁵ None of the cultures showed any tendency toward capsule formation when grown in any medium used, nor when recovered from peritoneal exudate after passage through the mouse. The moist india ink method and Gin's method⁶ were used in the search for encapsulated organisms. One c.c. of dextrose broth culture inoculated intraperitoneally was used for each mouse pathogenicity test.

All the cultures killed mice within 16 hours after inoculation except No. 36 which was found to be non-pathogenic.

SEROLOGY

Toxins produced by cultures of the hemolytic streptococci originally isolated from the throats of patients and from the milk and udder of cow No. 7 were tested for neutralization by standard scarlet fever antitoxin. The protocol covering the titrations is given in Table VI. It will be noted that one unit of antitoxin completely neutralized 1 c.c. of 1:100 dilution of toxin. The

TABLE V
CULTURAL REACTIONS AND CHARACTERISTICS OF ISOLATED HEMOLYTIC STREPTOCOCCI

Sugar Fermentation	Origin of Organism						
	Milk	Udder	Throat Cultures				
			13	31	15 *	27	36
Dextrose	pos. pH 5.6	pos. pH 5.4	pos. pH 5.4	pos. pH 5.2	pos. pH 4.6	pos. pH 5.2	pos. pH 5.0
Lactose	pos.	pos.	pos.	pos.	pos.	neg.	pos.
Sucrose	pos.	pos.	pos.	pos.	pos.	pos.	pos.
Maltose	pos.	pos.	pos.	pos.	pos.	pos.	pos.
Trehalose	pos.	pos.	pos.	pos.	pos.	pos.	pos.
Salicin	pos.	pos.	pos.	pos.	pos.	pos.	pos.
Mannite	neg.	neg.	neg.	neg.	neg.	neg.	neg.
Sorbitol	neg.	neg.	neg.	neg.	neg.	neg.	neg.
Tube hemolysis	4 plus	3 plus	3 plus	4 plus	doubtful	none	none
Hydrolysis of Sodium Hippurate	neg.	neg.	neg.	neg.	pos.	neg.	neg.
Capsules	none	none	none	none	none	none	none

* Surface cultures showed methemaglobin production. Sub-surface colonies showed hemolysis.

TABLE VI
SCARLET FEVER TOXIN ANTITOXIN TITRATIONS
10-26-34

— Neutralization
± Questionable Neutralization
+ or ++ No Neutralization

<i>Controls</i>			<i>Rabbit Number</i>					
			54	55	43			
1. Standard Toxin 164 BP+			—	—	—			
1 unit standard S. F. Antitoxin			—	—	—			
2. Standard Toxin 164 BP+			+	±	—			
¾ unit standard S. F. Antitoxin			++	++	++			
3. Standard S. F. Toxin 1-400			++	++	++			
<i>Petersburg Toxins</i>								
	(Rabbit No.)	<i>Throat</i>			<i>Udder</i>			<i>Milk</i>
		54	55	43	54	55	43	54 55 43
4. 1—1 saline		++	++	++	++	++	++	++
5. 1+1 unit S. F. Antitoxin *		+	+	—	+	±	+	±
6. 1—10 + saline 1 part		+	+	++	+	+	+	+
7. 1—10 + 1 unit S. F. Anti-toxin *		—	±	—	+	+	—	—
8. 1—100 + saline 1 part		+	+	+	+	+	—	±
9. 1—100 + 1 unit S. F. Anti-toxin *		—	—	—	—	—	—	—

* Where the statement is made "+ 1 unit of antitoxin" it means 1 part of the toxin dilution indicated is mixed with 1 part of antitoxin diluted so that it contains 1 unit.

titrations were repeated about 2½ months later (January 7, 1935), with the same results.

The toxin produced by the strain isolated from the cow's udder contained between 20,000 and 50,000 skin test doses per c.c.

Because erysipelas had developed as a complication in 5 of the cases of sore throat, the possibility of neutralization of the toxin produced by the strains with erysipelas antitoxin was considered. Similar dilutions of the toxin were titrated with erysipelas antitoxin produced by Parke Davis and Company, No. 024265 B. However, the erysipelas antitoxin was unable to neutralize the toxin produced by any of the strains from the Petersburg outbreak.

COMMENTS

Clinically, the disease produced by this infection differed materially from

scarlet fever. The differences may be summed up as follows:

1. Only 29 per cent of the cases had a rash, indicating that a predominating quality of the Petersburg strain was the production of disease primarily by tissue invasion, and secondarily by toxin production.

2. There was no selectivity for the younger age groups as is the case with scarlet fever.⁷ This observation agrees with the findings of Godfrey.⁸

3. Erysipelas was a complication of 5 cases in the Petersburg outbreak, whereas this complication is exceedingly rare in scarlet fever cases where cross-infection can be ruled out.*

4. There is some evidence, as demonstrated by the Dick test results, that the degree of immunity following infection with the Petersburg strain was less than might be expected following typical scarlet fever.

In spite of the clinical evidence cited above, the neutralization of the toxin

* Erysipelas occurred as a complication in but 1 of 9,061 cases of scarlet fever in Herman Kiefer Hospital, Detroit.⁹

produced by the Petersburg strain, by scarlet fever antitoxin, cannot be ignored, and it is hoped that future studies will throw more light on the intimate relationship between strains of hemolytic streptococci.

SUMMARY AND CONCLUSIONS

1. There were 186 known cases and 6 deaths in an outbreak of sore throat in Petersburg, Mich., during September, 1934.

2. The attack rate was 28.6 per 100 inhabitants, the fatality rate 3.22 per 100 cases.

3. The outbreak was caused by the transmission, through raw milk, of hemolytic streptococci from one infected quarter of one cow.

4. None of the cultures from the milk nor from the human throats showed the moist, mucoid colony nor the capsule formation characteristic of *Streptococcus epidemicus*.

5. The cow was probably infected by a hemolytic streptococcus of human origin.

6. There is evidence that gives credence to two theories: (a) that the infecting organism was originally a scarlet fever streptococcus particularly in view of the serologic behavior of the cultures, and (b) that passage through

the cow changed the organism making it dissimilar from the typical Dick strains in requiring a lessened oxygen tension to obtain optimum growth.

7. The disease produced by the Petersburg strain differed materially from scarlet fever in its usual clinical manifestations and more nearly resembled typical septic sore throat.

8. Hemolytic streptococci associated with scarlet fever, erysipelas, and septic sore throat may well be variables rather than fixed strains deserving separate classifications.

REFERENCES

1. Rambe, L., and Hedstrom, H. Scarlatina-Angina Caused by Hemolytic Streptococci from a Cow Affected with Mastitis. *Skandinavisk Veterinar-Tidskrift*, XXIV, 1934.
2. Madsen, Th. *Bull. d. l'off. intern. d'l'hyg. pub.*, XVIII:91, 1926.
3. Joe, A. *Lancet*, II:1321, 1925.
4. Davis, D. J. *J.A.M.A.*, LVIII:733, 1283, 1852-1854, 1912.
5. Frost, W. D., Thomas, R. D., Grumm, Mildred, and Shaw, Myrtle. *A.J.P.H.*, XIX:1081-1089 (Oct.), 1929.
6. (Gin's Method.) Robinson, E. S., Beckler, Edith A. *J. Prev. Med.*, III:227 (May), 1929.
7. Rosenau, M. J. *Preventive Medicine and Hygiene* (5th ed.). Appleton, New York, 1927, p. 219.
8. Godfrey, Edward S., Jr. *A.J.P.H.*, XIX:257-264 (Mar.), 1929.
9. Gordon, J. E. *Medical Report of Herman Kiefer Hospital, Detroit, for the five years 1927-1931*.

Residence Allocation

AN editorial in the January *Journal* made reference to recent progress in residence correction of vital statistics. Since that time, information has come to hand as to dates when certain states began correcting for residence. We are advised that Florida made partial allocations by residence in 1917; New York State made some experimental studies in 1918, and instituted a routine system of correction in 1926; in Connecticut, all tables have been corrected for residence since 1927; and in Rhode Island, since 1930. Doubtless other states than these have begun

publishing residence corrected tables.

The purpose of this statement is not to attempt to establish priority. To do this would demand a very time-consuming examination of many reports, and meticulous weighing of the varying extents to which residence allocation has been carried in different states. Our purpose, here, is primarily to indicate some sources, called to our attention, of residence-corrected statistics covering a period of years; and to encourage the progress of this important method of increasing the significance and usefulness of vital statistics. A. W. H.

Wax-Paraffin Ampules for Silver Nitrate Solution Used in Prevention of Ophthalmia Neonatorum

W. E. BUNNEY, PH.D.

*Associate Director, Bureau of Laboratories, Michigan Department of Health,
Lansing, Mich.*

THE purpose of the study reported in this paper was to develop a satisfactory ampule for silver nitrate solution used in prevention of ophthalmia neonatorum. The ideal ampule would have the following characteristics:

1. It would be made of a material not dangerous if accidentally dropped into the eye.
2. It would be easy to handle so that the amount of silver nitrate solution administered could be controlled and given at the exact instant desired.
3. The ampule would be of such material that it would not crack nor crumble during use.
4. The ampule would have no deleterious action on the silver nitrate so that silver nitrate solution contained in it would remain fresh indefinitely.
5. The ampule would be inexpensive.

Of the materials available for ampule manufacture, glass is undesirable because of the possibility of getting fragments into the eye and because of the difficulty of controlling ejection of the silver nitrate from the ampules. The preparation and use of wax ampules composed of beeswax, paraffin and paraffin oil has been previously described in a publication by Young.¹ These ampules are satisfactory in all respects except that the silver nitrate deteriorates rather rapidly to give an acid solution with a pH of about 2.2 and a deposition of a black precipitate on the

walls of the ampule. Study showed that the beeswax was responsible for this deterioration. In Pyrex flasks silver nitrate solution in contact with beeswax quickly became acid and showed the typical black deposit, while in similar flasks containing paraffin or paraffin oil there was no deterioration over 6 months' observation at room temperature. However, the beeswax was found essential to the formula since paraffin alone or any combination of paraffin and paraffin oil gave an ampule which cracked or crumbled when squeezed. Attempts to neutralize the beeswax by boiling with sodium hydroxide solution gave a more stable ampule but the silver nitrate still deteriorated within 1 month's incubation. Attempts to use a bleached beeswax gave a more attractive ampule but the deterioration was even more rapid than in the unbleached beeswax. Probably the yellow color prevents some deterioration due to photochemical action. An attempt was made to use synthetic waxes in place of beeswax without success, the ampules cracking too easily. Paper thimbles were impregnated with paraffin but it was found that too thick a coating had to be applied to prevent deterioration of the silver nitrate by the paper and that this thick coating made the resulting ampule too difficult to squeeze in ejecting the silver nitrate. It was found that

cellophane could not be used for ampules because the silver nitrate deteriorated rapidly.

It was thought that a satisfactory ampule might be one lined with paraffin and coated with a beeswax mixture so as to assure stability of the silver nitrate and the desirable properties of an ampule made out of a beeswax mixture. Attempts to use a low melting point paraffin for lining failed, since on dipping for the beeswax coat, the paraffin lining melted and boiled through the beeswax coat. Enough beeswax would penetrate to the inside of the ampule to cause deterioration of the silver nitrate. The use of a paraffin melting at 68° to 72° C. eliminated this difficulty. It was found best to add 12 per cent of paraffin oil to the paraffin because this gave a lining which crumbled easily but still had a sufficiently high melting point. If the lining did not crumble easily in squeezing, the hard paraffin lining would break through causing the ampule to crack.

METHOD

The method finally adopted for making the ampule is as follows:

1. Aluminum spindles are wiped with paraffin oil and dipped twice in a mixture of 12 per cent paraffin oil and 88 per cent paraffin melting at 68° to 72° C.

One dip was unsatisfactory because the coating cracked upon cooling. More than two dips were unsatisfactory because the paraffin broke through the beeswax mix coat on squeezing the ampule. The length of the paraffin coat should be a little greater than that of the beeswax (see No. 1, Plate I). This prevents the silver nitrate solution from coming in contact with beeswax.

2. The spindles are dipped in a mixture containing 71 per cent beeswax, 8 per cent paraffin oil, and 21 per cent of a 56° C. melting point paraffin.

The number of dippings varies with the temperature of the mix and of the room. The lower melting point paraffin was used in the mix because it was cheaper. Many other combinations of beeswax, paraffin oil, and paraffin were tried for the outer coat-

ing and found less satisfactory. If more paraffin was used, the ampules were found to crack on squeezing, and if less was used or the paraffin oil omitted, the ampules were found to crumble if squeezed when cold.

3. The ampules are placed in racks for filling.

4. Silver nitrate solution is filled into the ampules.

5. Melted paraffin is floated onto the surface of the silver nitrate solution to seal the ampule.

This insures the silver nitrate solution being in contact only with paraffin. The ampule could not be crimped and sealed in the usual manner because the paraffin lining cracked on squeezing.

6. The rack containing the ampules is inverted over an electric plate and the ampules seared off to a uniform level.

7. The rack full of ampules is inverted over a melted bath of the beeswax mix and the ampules dipped to seal the ends further. The finished ampule is shown in Plate I (No. 2).

RESULTS

A study of the behavior of silver nitrate solution in the old ampule showed that the silver nitrate solution deteriorated rapidly at a temperature of 37.5° C., less rapidly at room temperature, and was quite stable at a temperature of 5° to 10° C. In order to speed up the comparison of the stability of silver nitrate solution in the new ampule with the stability in the old, both kinds of ampules were filled with the same



PLATE I—The Finished Ampule

TABLE I

COMPARISON OF THE STABILITY OF SILVER NITRATE SOLUTION IN UNLINED BEESWAX AMPULES
WITH THE STABILITY IN PARAFFIN LINED AMPULES*Stability at 37.5° C.*

	Time						
	0	1 wk.	1 mo.	2 mo.	3 mo.	4 mo.	6 mo.
<i>Unlined Beeswax Ampules</i>							
Silver nitrate content per cent..	1.47		1.43	1.44	1.49	1.58	1.64
pH	5.4	2.4	2.2	2.2	2.2	2.0	2.0
<i>Paraffin Lined Beeswax Ampules</i>							
Silver nitrate content per cent..	1.47		1.51	1.52	1.52	1.51	1.54
pH	5.4	5.4	5.4	4.4	4.4	4.0	4.0

Stability at Room Temperature

	Time						
	0	1 wk.	1 mo.	2 mo.	3 mo.	4 mo.	6 mo.
<i>Unlined Beeswax Ampules</i>							
Silver nitrate content per cent..	1.47			1.48			1.44
pH	5.4			2.2			2.2
<i>Paraffin Lined Beeswax Ampules</i>							
Silver nitrate content per cent..	1.47			1.54			1.53
pH	5.4			5.0			4.5

Stability at 5° to 10° C.

	Time						
	0	1 wk.	1 mo.	2 mo.	3 mo.	4 mo.	6 mo.
<i>Unlined Beeswax Ampules</i>							
Silver nitrate content per cent..	1.47			1.52			1.50
pH	5.4			4.0			4.0
<i>Paraffin Lined Beeswax Ampules</i>							
Silver nitrate content per cent..	1.47			1.52			1.52
pH	5.4			5.2			4.4

silver nitrate solution, placed in the incubator at 37.5° C. and tested at intervals as shown in Table I. As a check on the results both kinds of ampules were left at room temperature and also placed at 5° to 10° C. and tested at intervals (Table I).

The variation in the silver nitrate content of the unlined beeswax ampule during incubation at 37.5° C. is interesting. A possible explanation for the initial drop would be the destruction of the silver nitrate and deposition of the insoluble precipitate. The contents of the ampules were filtered before the silver nitrate content was determined. A possible explanation for the subse-

quent rise in silver nitrate concentration is that water passed through the walls of the ampule, and that the silver nitrate ions did not, so that on long incubation a gradual concentration took place. If this is the explanation, it is interesting that the paraffin lining slowed up the process. Evidently at room temperature this phenomenon does not take place to as great an extent since the unlined ampules show only a slight drop in silver nitrate content.

Ampules from three commercial firms and one state laboratory were obtained and examined. The results (Table II) indicated superiority of the ampule described in this paper. It is interesting

TABLE II

COMPARISON OF THE STABILITY OF SILVER NITRATE IN PARAFFIN LINED AMPULES WITH THAT IN AMPULES PREPARED BY OTHER MANUFACTURERS

	Original pH	pH After 1 Mo. Incubation at 37.5° C.
Paraffin lined ampules.....	5.4	5.4
Manufacturer 1	3.4	2.2
“ 2	3.6	
“ 3	2.6	
“ 4	3.6	2.6

that the silver nitrate solutions from these four manufacturers were more acid when received than was that in the paraffin lined beeswax ampule after 6 months' incubation at 37.5° C.

The behavior of the silver nitrate in this paraffin lined ampule will be studied over a period of years, but it seems safe to say at this time that the silver nitrate solution will retain the characteristics of a fresh solution in the new ampules for from 10 to 12 times as long at the relatively high temperature of 37.5° C. as does the silver nitrate solution in the old type of ampule. Because of these results our silver nitrate ampule will be distributed with an expiration date of 1 year, instead of the

present 6 months dating, until further study has been made.

EQUIPMENT

The equipment for making the ampules is shown in Plate II. Constant temperature bath B is used for the paraffin-paraffin oil mixture, and bath C for the beeswax mixture. These baths are regulated to a temperature which keeps the contents fluid without overheating. If the baths are permitted to get too hot an undesirable smoking and a darkening of the beeswax results and, moreover, too many dippings are required to build up a satisfactory coat on the spindles.

Each bath was fitted with a constant

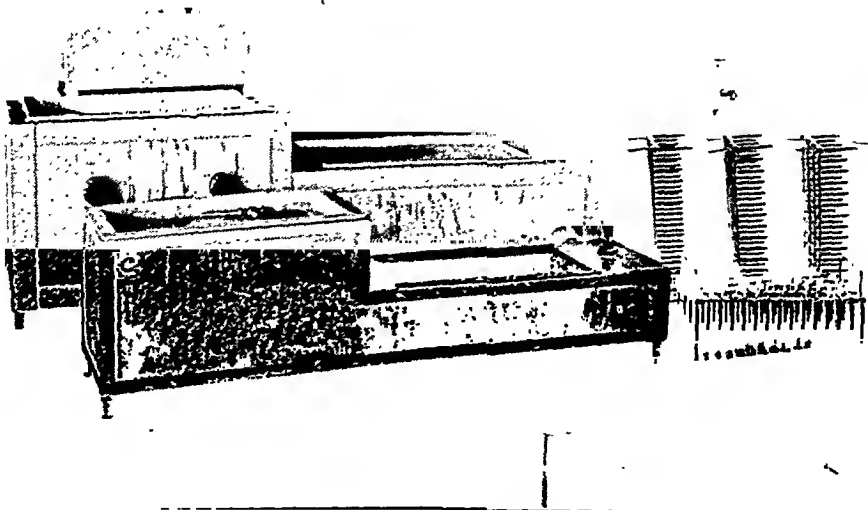


PLATE II—Equipment for Making Ampules

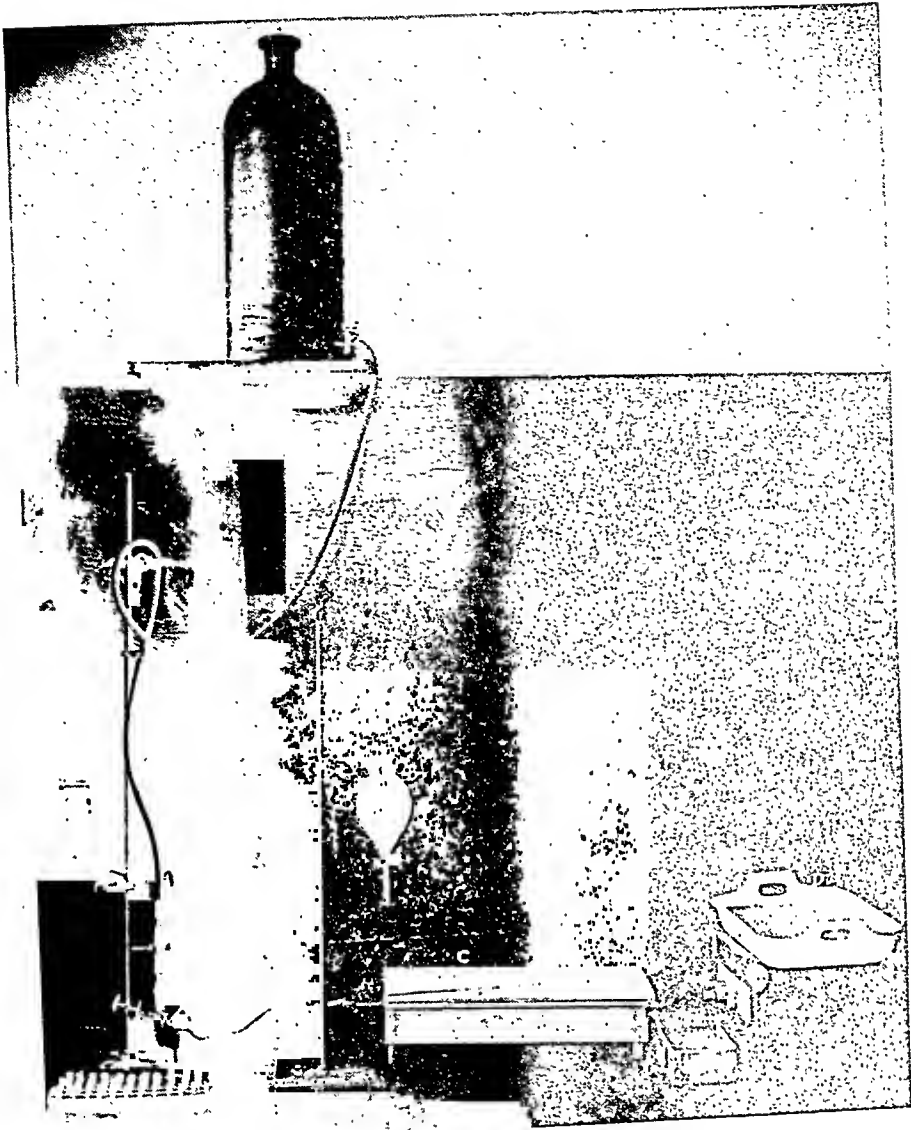


PLATE III—Filling Apparatus

level device. That for bath B has been raised up and is lettered A in Plate II. It consists of a Monel metal box without a bottom. A valve and rubber hose attachment is inserted in the top of the box so that when the box is in position as in bath C, the melted mixture can be poured around the outside of the box and sucked up into it by vacuum applied to the hose connection. A hole in the side of the box at the right height to give the desired level in the dipping end of the bath completes the apparatus. This apparatus has the advantage

of being simple to make, easy to clean, and easy to fill. There is no part to plug up with solidified wax, since the wax or paraffin need not come in contact with the valve. The spindles in the dipping racks shown at the right of the baths are made of aluminum which makes the racks of 60 spindles light enough to be easily handled without fatigue. The handles on the racks facilitate the dipping.

The filling apparatus is shown in Plate III. The ampules to be filled are placed in the aluminum block shown

below A in the plate. This block has three rows of holes which hold the ampules so they will not fall out when the plate is inverted, and yet are not so small as to make loading and unloading difficult. The silver nitrate solution is kept in a black bottle shown in the plate and is filled through an automatic, intermittent siphon dispensing apparatus lettered A. This was devised by Bukoski.² Four-tenths c.c. of silver nitrate solution is found to give a satisfactory ampule. When a block of ampules is filled with silver nitrate solution, melted paraffin is run in on top of the solution from the separatory funnel B. This paraffin solution is kept hot during the filling operation by lowering the funnel into a cup of heated paraffin solution when it is not being used for sealing the ampules. The paraffin plugged ampules are then seared off to a uniform level by inverting the block and searing the ampules on the hot Plate C. This hot plate slopes to the

right and to the front and has a trough on the right and front edges so the melted paraffin and beeswax from the searing runs down the trough into the box placed at its right end. The heaters in the hot plate are chosen so the plate gets warm enough to melt the paraffin and beeswax but not hot enough to burn, thus no smoke or objectionable odor results from this part of the procedure. The block of seared ampules is then dipped in the bath of melted beeswax mixture lettered D. The ampules are dipped while still in the inverted position and this gives a finish coat to the seared end of the ampules which aids in holding the paraffin plug in position so that when the ampule is squeezed in use, the paraffin plug will not be forced out.

REFERENCES

1. Young, C. C., Preparation of Silver Nitrate Ampules. *Michigan Pub. Health* (Sept.), 1924, p. 305.
2. Bukoski, Henry. An Automatic Liquid Dispenser. *A.J.P.H.* 25, 6:749 (June), 1935.

Amebic and Other Intestinal Protozoal Infestations in Representative Groups of New York City

RALPH W. NAUSS, M.D., DR.P.H., F.A.P.H.A.,
AND MAY H. SALINGER

*Parasitological Laboratory, Department of Public Health, Cornell University
Medical College, New York, N. Y.*

THE incidence of human intestinal protozoal infestation is widely recognized to be quite general throughout the United States, although according to reports of various investigators, it varies considerably in different localities.

Sumerlin¹ has tabulated the results given in various publications which have appeared during the past 10 years,^{2-7a, 8, 9} in connection with similar data from his own studies of 1,850 persons. The range in percentage of organisms found in these 9 groups was:

	Per cent
<i>Endameba histolytica</i>	0.2-15.6
<i>Endameba coli</i>	4.0-19.6
<i>Endolimax nana</i>	0.8-16.9
<i>Iodameba williamsi</i>	0- 5.3
<i>Giardia lamblia</i>	2.4- 6.5
<i>Chilomastix mesnili</i>	1.3-11.5
<i>Trichomonas hominis</i>	0.1- 5.9

For *Endameba histolytica* infestation higher percentages than these have been claimed by other investigators. In 1911, Sistrunk¹⁰ reported 17.2 per cent in 145 persons examined at the Mayo Clinic; Sanford¹¹ in 1911-1916, 22.5 per cent in 5,000 persons also at the Mayo Clinic; Kofoid and Swezy¹² in 1920, 53.2 per cent among 154 soldiers in California, a majority of whom however had been overseas; Faust,^{7b} in 1928, in Wise county, southwestern Virginia, 20 per cent in

460 individuals examined; and Meleney^{13a} 1929-1931, in rural Tennessee, 17.3 per cent and 38 per cent respectively. However, the percentages given in surveys published during the past 10 years, as tabulated above, seem to represent the variations generally to be expected in the United States. Faust,^{7a} in his 3 specimen survey of 1,000 persons at New Orleans in 1931, found an average infestation with *E. histolytica* of 13.8 per cent, distributed as follows:

	Per Cent
Welfare Clinics and Pediatric Service	7.7
Boys' Home	12.5
Male Medical Wards	27.2
Female Medical Wards	13.1
Obstetric Service	25.2
Medical Students (F. M. Johns)	8.27
Ambulatory Cases (F. M. Johns)	7.26
Private Pay Patients (F. M. Johns)	9.05

These figures show variation in percentage in the various groups studied. Comparing these results with those of somewhat similar group studies made by him^{7a} in Panama during the summer of 1931, Faust was able to show the influence of economic status, personal hygiene and sanitation on the incidence of protozoal infestation. Both groups, which comprised approximately 1,000 and 2,000 persons respectively, present a fairly representative cross-section of

TABLE I
(GROUP 1)

RESULTS OF EXAMINATION OF SINGLE SPECIMEN

Method of Examination	Direct		Direct and Culture				Culture	
Number of Examinations	270		75		75		109	
Organism	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	Per Cent
<i>Endameba histolytica</i>	3	1.1	14	18.7	14	18.7	9	8.3
<i>Endameba coli</i>	8	2.9	4	5.3	1	1.3		
<i>Endolimax nana</i>	3	1.1	0	0	0	0		
<i>Iodameba williamsi</i>	2	0.7	1	1.3	0	0		
<i>Dientameba fragilis</i>	2	0.7	1	1.3	3	4.0		
<i>Trichomonas hominis</i>	0	0	0	0	1	0	3	3.3
<i>Chilomastix mesnili</i>	1	1.1	0	0	1	1.3		
<i>Giardia lamblia</i>	4	1.5	2	0	0	1.3		
Negative	236	87.4	68	90.7	69	92.0	100	91.7

the respective populations. He further indicates that, except for the extremes, the Panama group shows percentages quite similar to the New Orleans group. The extremes referred to, consisted of inhabitants of unsanitated river villages on the one hand, and on the other of American whites living in the tropics under the best practical hygienic and sanitary conditions obtainable, which, as Faust states, "might well be emulated in cool as well as in warm climates."

AMEBIASIS IN NEW YORK CITY

Bishop and Bishop¹⁴ concluded that amebiasis occurring endemically in New York City is probably far more prevalent than is commonly supposed. They were unable to reach any conclusions as to the epidemiology of this condition and believed that more attention should be paid to the detection of carriers.

During the past 4 years the author and his assistants have examined the colonic contents from approximately 850 persons for the presence of intestinal protozoa. About two-thirds of the specimens came to us through the coöperation of the Department of Gastro-Enterology of the former pay-clinic of Cornell Medical School, New York City, and of the Outpatients Department of the New York Hospital-

Cornell Medical Association at the new Medical Center on York Avenue at the East River between 68th and 71st Streets, Manhattan. The balance, comprising about one-third of the total, consisted of New York Hospital patients, of private cases of staff members of this institution, and of an additional 200 adults of various ages, the sexes being about equally represented. The groups as a whole present a fairly representative cross-section of the population of New York City.

The data in Table I comprise the accumulated results of routine examinations of the fecal material which came to the laboratory throughout the 4 years covered by these studies. During the first 2 years, direct examination was largely relied upon, the material being kept warm in thermos bottles until examined and rarely held over for examination for more than 2 hours. During the second 2 year period cultural methods on an ever increasing scale were employed as well. In most instances the material was secured directly from the lower bowel through a proctoscope or sigmoidoscope.*

The results obtained from the first

* Dr. Douglas Palmer, now Chief of Gastro-Enterology Clinic, was most obliging at all times in this connection, and formal acknowledgment is hereby made of this assistance.

270 persons who were examined by direct methods only (observation being restricted to a fresh saline-iodine preparation and a permanent Heidenhain iron-alum hematoxylin stained smear), parallel quite closely percentages reported in 1930 by Andrews and Paulson⁶ from a study of 522 out-patients at the Johns Hopkins Clinic in Baltimore, Md. Their total incidence of protozoa infesting the human intestinal tract was 10.9 per cent, while our total percentage in this series was 9.1 per cent. With the exception of *E. histolytica*, our percentages for individual organisms are somewhat less than theirs. Judging from clinical findings and symptomatology, we are convinced that our single instance of a materially higher percentage for *E. histolytica* is probably at least less than half the true figure for this organism. The consistently lower percentages in the case of other protozoa is also believed to be somewhat less than the true figure. In explanation, we would suggest that this disparity may be due to the small quantity and mucoid character of the

sigmoidoscopic specimens, as well as to the inferiority of the permanent preparations made in the early stages of this investigation. In fact, in such routine surveys as these, it is doubtful if the results obtained from examination of sigmoidoscopic specimens have any superiority over those obtained from examination of material secured in other ways, except where there are observable lesions in the lower bowel. On the contrary, we deem this method in general inferior to direct examination of a loose stool following mild catharsis, or even to examination of a normal stool which has not been subjected to desiccation in the rectum. If, in addition, one applies the generally accepted dictum that a single specimen examination reveals not more than one-third to one-half of the protozoa actually present in the bowel, it can readily be seen that the percentages now reported for this first group of 270 persons are undoubtedly low and should not be accepted as adequately representing the true percentages of intestinal protozoal infestation of this group.

TABLE II

(GROUP 2)

RESULTS OF EXAMINATION OF SINGLE SPECIMEN

Findings		Method of Examination							
		Saline and Iodine		Cyst Concentrate		H. H. Stain		Culture	Cases
		Cases	Per Cent	Cases	Per Cent	Cases	Per Cent		
<i>Endameba histolytica</i>	{ Veg.	4	1.8	1	0.5	2	1.0		9
	{ Cyst	8	3.6	9	4.5	7	3.3		0
<i>Endameba coli</i>	{ Veg.	5	2.3	0	0	1	0.5		0
	{ Cyst	19	8.6	29	14.4	12	5.6		3
<i>Endolimax nana</i>	{ Veg.	1	0.5	0	0	6	2.8		0
	{ Cyst	6	2.7	9	4.5	13	6.1		0
<i>Iodameba williamsi</i>	{ Veg.	1	0.5	0	0	2	1.0		0
	{ Cyst	1	0.5	1	0.5	4	2.0		0
<i>Dientameba fragilis</i>	Veg.	11	5.0	0	0	11	5.1		3
<i>Giardia lamblia</i>	Cyst	12	5.4	12	6.0	14	6.5		1
Flagellates		2	1.0	0	0	4	2.0		0
Negative		138	62.0	141	69.8	93	43.4		18
No. of Examinations		222		202		214			29

As for the cultural results shown in Table I, in which 75 of the 184 cases so studied were checked by direct slide examinations, it should be pointed out that these were cases more or less selected on the basis of the sigmoidoscopic findings, history, and symptomatology. The results obtained seem to indicate the value of culture alone in the study of properly selected sigmoidoscopic material. Further discussion of the actual advantage to be derived from selective culture will be given in connection with Tables II, III, and IV.

Table II records the results of careful examinations of one fresh stool specimen from each of a group of 222 persons engaged in preparing, handling, and serving food. These persons were employed in an institution where hygienic and sanitary conditions were of the best and where every effort is made to maintain a high degree of excellence at all times. All of the members of this group were adults, the majority were under 30 years of age, and the sexes were about equally represented. Rarely was any history given pointing to gastrointestinal symptoms which might lead one to suspect the possibility of any kind of parasitic intestinal infestation. In case of the most pronounced and persistent amebic cyst carrier, where repeated inquiry was made in regard to bowel symptoms, the replies were consistently of a negative character.

On all suitable specimens, a saline-iodine preparation, a cyst concentrate and a Heidenhain hemotoxylin stained smear, were made and studied. Cultures were not, however, made routinely, this method of search being reserved for confirmation of the other findings, *i.e.*, when the findings were open to doubt, or suspicion had been aroused in the course of observation of the saline-iodine or other preparations. In order to insure freshness and correct identification of individual specimens, these

were obtained under proper supervision, placed in pint cardboard containers with tightly fitting lids, promptly delivered, and placed in an incubator until examined.

With the exception of attempted cyst concentration, which was usually postponed until the end of the day, every effort was made to carry out the various procedures promptly on a fresh warm stool. By so doing, we were frequently able to observe motility and to judge relatively the number of vegetative and cyst forms, and their possible significance at the time the stools were passed.

The percentages of infestation presented in Table II, we believe, represent fairly accurately, though not completely, the relative numbers of vegetative and cyst forms for the various protozoa observed. A parallel study of the same specimen by the different methods of search employed by us also serves to evaluate to some extent the relative effectiveness of the various modes of examination utilized. For example, an attempted concentration of cysts by the method devised by Yorke and Adams¹⁵ proved to be disappointing. This method, given by Thompson and Robertson,¹⁶ is as follows:

1. Make as fine an emulsion as possible of a portion of feces about the size of a walnut. The feces should be placed in a mortar and rubbed up with tap water.

2. Mix this fecal emulsion with about 500 c.c. of tap water and place the mixture in a tall glass cylinder in which it is allowed to stand for 15 minutes.

3. At the end of that time three layers have more or less separated off. On the top there forms a sort of scum, at the bottom a considerable amount of sediment, while the bulk consists of a fairly even suspension of fecal particles which also contains the bulk of the cysts. Remove the scum from the surface.

4. Syphon off the remainder of the fluid, leaving the debris at the bottom of the cylinder and about an inch of fluid above it untouched. Discard the scum and the material at the bottom of the cylinder and place the intermediate fluid in a clean cylinder.

5. Allow the fluid to stand overnight. The cysts now precipitate to the bottom of the cylinder.

6. Syphon off the supernatant fluid, and this time discard it, retaining the deposit at the bottom of the cylinder.

7. This precipitate should be washed several times by shaking up with water and centrifuging each time.

(According to our experience, satisfactory results can be obtained by direct examination of this sediment, thus obviating additional centrifugations.)

In so far as this method of attempted concentration of cysts as a means of direct search is concerned, it would appear from our experience that it has little advantage over the study of saline-iodine and permanently stained preparations, except in the case of *Endameba coli* cysts. Apparently no very appreciable or consistent actual degree of the cyst concentration may be expected in case of the smaller protozoal cysts, with the possible exception of *Giardia*. Our conviction in regard to this matter is that the more or less colloidal condition of the material found in the average stool specimen makes consistent concentration, at least for the smaller cysts, quite unreliable, and our experience certainly does not justify its use as an exclusive method of search. It does, however, appear to be useful in conjunction with other methods, particularly in the preparation of fecal material for culture. We have tried certain other methods recommended for concentration of cysts, but not with very gratifying success.

Little need be said here about the value and necessity of the properly prepared and stained smear. This should always be made and used as an ultimate check-up and for future reference. We found it of inestimable value in these studies, particularly when employed to confirm the results obtained from cultures. We did not find it practicable to stain from culture as we should have done if it had not entailed too much

additional routine at the time. Checking up the results of culture against those of corresponding stained preparations, we are able to show that the relatively high percentage of apparently positive cultures for *E. histolytica* may be accounted for. A careful study of the stained smears made at the same time as the positive amebic cultures reported in Table II and following tables, revealed that in about half of them no evidence of *E. histolytica* could be found, whereas *E. coli* cysts were invariably found.

The Difco Bacto Liver Infusion Agar with horse serum diluted in saline (1:10), and whole rice flour as devised by Cleveland^{17a} was employed as medium. Cleveland states, "So far as the amebae of man are concerned, this medium appears to be practically specific for *E. histolytica*." Contrary to his experience we have been able to grow *Dientameba fragilis* fairly consistently on this medium employing the horse serum saline in dilution of 1-10, but agree with him in his statement that "Evidently *D. fragilis* is more common than the surveys that have heretofore been made indicate."

Since the publication of Cleveland's article, Arnett, Weinrich, and Stabler¹⁸ found by direct stain an incidence of 3.5 per cent of *D. fragilis* in "A survey of 401 college students for intestinal protozoa." They state that "An incidence of 3.5 per cent in this survey indicates that *D. fragilis* is not so rare as commonly supposed."

Tables III and IV comprise the findings in 55 persons selected from the 222 reported in Table II, and are designated as groups 3a and 3b. These were either positive for one or more protozoa upon the first examination, or our impression was of such a character as to prompt us to call for a second specimen at once. In compiling Table IV, our conclusions were based on the final result of the examinations of the

TABLE III

(GROUP 3a)

RESULTS OF EXAMINATION OF ONE SPECIMEN FROM 55 PERSONS SELECTED
FROM GROUP 2, TABLE II

Organism		Method of Examination							
		Saline and Iodine		Cyst Concentrate		H. H. Stain		Culture Cases	
		Cases	Per Cent	Cases	Per Cent	Cases	Per Cent		
<i>Endameba histolytica</i>	{ Veg.	4	7.5	1	2.0	2	4.0	.9	
	{ Cyst	6	10.9	4	7.8	5	10.0	1	
<i>Endameba coli</i>	{ Veg.	5	9.1	0	0	1	2.0	0	
	{ Cyst	14	25.4	18	35.3	11	22.0	3	
<i>Endolimax nana</i>	{ Veg.	1	1.8	0	0	6	12.0	0	
	{ Cyst	6	10.9	8	15.7	7	14.0	0	
<i>Iodameba williamsi</i>	{ Veg.	1	1.8	0	0	2	4.0	0	
	{ Cyst	1	1.8	1	2	2	4.0	0	
<i>Dientameba fragilis</i>	Veg.	4	7.5	0	0	3	6.0	3	
<i>Giardia lamblia</i>	Cyst	4	7.5	5	9.8	3	6.0	0	
Flagellates		0	0	0	0	4	8.0	1	
Negative		18	32.3	18	35.3	17	34.0	3	
No. of Examinations		55		51		50			

two specimens submitted by the same person at different times. Our purpose in presenting these tables is to show: (1) the effect of a second examination of a stool specimen by the various methods employed by us and (2) to analyze further the probable identity of amebae obtained in culture. In this connection, it must be kept in mind that the percentages given in Tables III and IV only apply to this group of 55 selected cases (groups 3a and 3b). A number of these were found to be positive upon examination of the first specimen as recorded in the complete one specimen survey given in Table II. Therefore these percentages should be employed only in connection with this Table II for analytical and comparative purposes.

As to the value of making subsequent examinations of specimens from the same person, particularly when the first examination gave positive results for one or more protozoa of whatever sort, or in case suspicion was aroused in consequence of the first examination, it

may readily be seen that such procedure is certainly justifiable. A similar third examination of about 20 persons included in Tables III and IV, would seem to indicate that triple examinations have some further advantages, but that the proportionate percentage increases would be somewhat less. This agrees in general with what others have reported on this point.

Regarding the identity of the amebae briefly referred to in the discussion of Table II, our findings, as recorded in Tables III and IV, seem to warrant the conclusion that in addition to the excystation and growth of *E. histolytica* and *E. coli* and multiplication of *D. fragilis* in culture on Cleveland's medium, *Endolimax nana* may appear in vegetative form in a not inconsiderable number of instances. With *Iodameba* we did not get any apparent positive results in culture, but the number involved (2 positives by other methods) does not justify any definite conclusion. The flagellates *Trichomonas hominis*, *Chilomastix mesnili*,

TABLE IV

(GROUP 3b)

RESULTS OF EXAMINATION OF TWO SPECIMENS FROM EACH OF THE 55
PERSONS SELECTED FROM TABLE II

Organism			Method of Examination							
			Saline and Iodine		Cyst Concentrate		H. H. Stain		Culture	
			Cases	Per Cent	Cases	Per Cent	Cases	Per Cent	Cases	
<i>Endameba histolytica</i>	{	Veg.	6	10.9	0	0	3	5.6	18	
	{	Cyst	9	16.4	11	20.0	9	17.0	1	
<i>Endameba coli</i>	{	Veg.	4	7.5	0	0	3	5.6	0	
	{	Cyst	14	25.4	18	32.7	18	34.0	3	
<i>Endolimax nana</i>	{	Veg.	5	9.1	0	0	7	13.2	3	
	{	Cyst	6	10.9	12	21.8	9	17.0	0	
<i>Iodameba williamsi</i>	{	Veg.	1	1.8	1	1.8	3	5.6	0	
	{	Cyst	0	0	1	1.8	2	3.8	0	
<i>Dientameba fragilis</i>		Veg.	7	12.7	1	1.8	6	11.3	5	
<i>Giardia lamblia</i>		Cyst	4	7.5	5	9.1	7	13.2	1	
Flagellates			0	0	0	0	4	7.6	2	
Negative			14	25.4	15	27.3	12	22.6	10	
No. of Examinations			55		55		53			

and *Embadomonas intestinalis*, seemed to grow quite readily, judging from the small number of cases which came under our observation. All of these were positive in culture as well as by one or more of the other methods of search employed.

The total percentage of *E. histolytica* found in Group 2 (Table II), comprising 222 food handlers, was 5.4 per cent based on a single specimen survey. Group 3a (Table III), composed of 55 persons selected from Group 2 (Table II), for further examinations represented nearly 85 per cent of the positives in Group 2 (Table II). A comparison of the total percentage of 18.4 per cent positives for *E. histolytica* in Group 3a (Table III), with the 27.3 per cent of like positives in Group 3b (Table IV), shows an approximate increase of nearly 50 per cent in positive results for *E. histolytica* in these 55 persons, whose stools were examined a second time. If in lieu of a second specimen examination of the 167 persons remaining in Group 2 (Table II)

(in which two additional cyst carriers of *E. histolytica* were revealed upon inspection of the Heidenhain iron-alum hematoxylin stained specimens), one were to apply a similar approximate ratio of increase, namely 50 per cent, a percentage of positives of between 7 and 8 per cent might be anticipated. Assuming in addition that a third specimen examination of the whole of Group 2 had also been made, it seems reasonable to predict that the total number of positive amebic cyst carriers in this group of food handlers might possibly have been somewhere between 9 and 10 per cent.

DISCUSSION

At the present time there appear to be two outstanding facts deducible from data available on the prevalence of amebiasis and amebic dysentery in non-tropical countries, namely that comparatively few cases of the latter are recognized or even suspected, and that laboratory evidence reveals the presence of cysts of *E. histolytica* in sig-

nificant percentages in all groups of the general population. The question, therefore, arises as to whether the mere presence of any considerable group of individuals harboring cysts of this parasite constitutes a real public health hazard or only a minor personal health menace. Under similar circumstances and conditions, as Faust^{7a} has shown, there appears to be little difference in so far as climate is concerned. Sporadic cases of active infection with *E. histolytica* not infrequently occur in non-tropical localities, where the evidence points to a purely local origin. While we have not at the present time many reported cases of such individual instances, where the epidemiological evidence is complete, nevertheless, most workers familiar with this subject have little doubt that inception of infestation or infection is undoubtedly occurring more or less frequently. These cases may manifest no symptoms or no more than the mild, indefinite, frequently unrelatable, gastrointestinal symptoms commonly complained of by people in general.

As evidence on this point, Craig¹⁹, p. 8 claims to have seen 7 cases of liver abscess occurring in individuals who had never been out of the United States and who had never suffered from dysentery or repeated attacks of diarrhea, and Mackie and Nauss²⁰ reported recently on an investigation of familial infestation and infection where circumstances were such that the original infestation must have been contracted in or near New York City. Sanford¹¹ also pointed out that the majority of their positive amebic cases were undoubtedly endemic to the Northwest United States.

Such a view seems to conform with our present knowledge regarding this condition. Active recognizable symptoms are the exception, although varying numbers of individuals are infested with *E. histolytica* as revealed by the

finding of the characteristic cysts in the bowel contents. Consequently, we are inclined to look upon the symptom-manifest case of amebiasis as somewhat incidental. This appears likely to be the case also when the disease takes on epidemic characters although the underlying causes may be entirely different. It seems quite possible that the depressed resisting power of the gut wall may play the major rôle in this connection. Such factors as mechanical, nutritional, and toxic trauma, originating from within as well as from without, might constitute essential contributing etiologial factors. In other words, the infestation in most instances may be quite superficial with few, small, scarcely recognizable lesions which heal quite rapidly and may reappear elsewhere. This was found to be the case at autopsy by Bartlett²¹ in Egypt during the World War, and by Hegner and colleagues²² in 1931, in the majority of monkeys infected by the administration of washed cysts *per os*.

In regard to the rôle which intestinal bacteria may possibly play in this connection, Cleveland and Sanders^{17b} found that the pathogenicity of their pure line strain of *E. histolytica*, diminished greatly after being in culture for 1 year, but that liver or intestinal passage seemed to increase its virulence. In order to determine whether the ameba or the bacteria regained pathogenic qualities, bacteria from amebic cultures which had been through several liver passages were inoculated together with cultures of *E. histolytica* which had apparently lost their virulence. An increased incidence of liver abscess followed. It was then concluded that the amebae were unable to maintain themselves in the liver unless accompanied by bacteria capable of doing some damage to this organ. Cleveland and Sanders also believed that the increase in incidence of intestinal infection which they obtained after

repeated liver passages of the amebic cultures may have been due to the increased virulence of the bacteria rather than to that of the ameba. The outcome of an experiment by the writer during the course of amebic cultural studies several years ago affords still more positive evidence of the probable selective accessory action of bacteria.

Cultural strains of *E. histolytica* which had been isolated from 2 clinical cases of amebic dysentery respectively about 6 and 1½ months previously, were employed in this experiment. Kittens of the same litter, of approximately the same weight and physical condition, were inoculated with these cultures per rectum through a small catheter after a cleansing enema. Only the kitten receiving the younger culture showed signs of infection, as indicated by diarrhetic stools, rapid loss of weight, failing appetite, and death within about 2 weeks. The other showed no signs of reaction, although repeated attempts were made to infect with the older strain, until it had been injected previously or simultaneously with a broth culture of *B. coli* of the hemolytic variety. This strain, received from Dr. John C. Torrey, had been recently isolated from a case of nonspecific ulcerative colitis and has proved unusually virulent for mice and rabbits. Within a few days of this dual inoculation with the apparently innocuous amebic culture reinforced by the presence of a virulent strain of *B. coli*, the kitten began to pass soft stools with considerable amounts of mucus, containing characteristic vegetative forms of *E. histolytica* which were repeatedly found microscopically. This kitten recovered completely after several weeks.

The significance of this and subsequent experiments, in line with Cleveland's work and belief already referred to, will be discussed later in a paper devoted to the pathology of amebiasis and the significance of cyst carriers.

Suffice it here to state the author's suspicion that intestinal bacteria may possibly play a very important accessory rôle in aiding *E. histolytica* to penetrate the intestinal mucosa and in contributing materially to the ultimate formation and probably advancement of the characteristic end product, the amebic ulceration so familiar to the pathologist.

Finally, with reference to the possibility that amebiasis may manifest true epidemic characters, a study of the reports thus far published relative to the outbreak originating in Chicago last year strongly suggests gross contamination of food or water or both as the outstanding epidemiological probabilities. This statement is supported somewhat by experimental evidence in so far as success in acutely infecting laboratory animals depends on the administration of comparatively large doses of ameba. Infection may occur directly from a cyst infested food handler, but it seems rather doubtful if any considerable number of individuals would be acutely infected in this manner at the same time. Hence the appearance epidemically of cases of clinical amebiasis would appear not to be the rule unless a large number of cysts of *E. histolytica* have been ingested by various persons at or about the same time. Epidemic prevalence of amebiasis is probably therefore, associated with gross contamination of food or water or both. Ordinarily it would seem that direct hand to mouth, food or utensil transmission could rarely accomplish this result.

SUMMARY AND CONCLUSIONS

1. A brief review is given of published reports of human protozoal surveys made in the United States and Panama.

2. Surveys for intestinal protozoa in several groups of persons in New York City, thought to be representative of this locality, are presented in tabular form with explanatory matter and relevant discussion.

3. Different methods of search for protozoa in stools are compared as to their value and desirability.

4. The limitations and value of cyst concentration and culture as methods of search are briefly discussed.

5. Amebic infestation and amebic dysentery are discussed briefly in the light of present knowledge and experience.

REFERENCES

1. Sumerlin, H. S. Amoebiasis, incidence in private practice. *J.A.M.A.*, 102:363 (Feb. 3), 1934.
2. Boeck, W. C., and Stiles, C. W. Studies on various intestinal parasites of man. *Bull. 133, Hyg. Lab. U.S.P.H.S.*, 1923.
3. Williamson, C. S., Kaplan, B., and Geiger, J. C. A survey of Amoebic dysentery in Chicago. *J.A.M.A.*, 92:528 (Feb. 16), 1929.
4. Williamson, C. S., Kaplan, B., and Geiger, J. C. *Ibid.*
5. Kessel, J. F., and Mason, V. R. Protozoal infection of the human bowel, a comparison of laboratory and clinical observations. *J.A.M.A.*, 94:1 (Jan. 4), 1930.
6. Andrews, J., and Paulson, M. The incidence of intestinal protozoa with special reference to *Endamoeba histolytica* in residents of the temperate zone. *Am. J. Med. Sc.*, 181:102 (Jan.), 1931.
- 7a. Faust, E. C. The incidence and significance of infestation with *Endamoeba histolytica* in New Orleans and the American tropics. *Am. J. Trop. Med.*, 11:231 (May), 1931.
- 7b. Faust, E. C. A study of the intestinal protozoa of a representative sampling of the population of Wise County, Southwestern Virginia. *Am. J. Hyg.*, 11:371 (Mar.), 1930.
8. Meleney, H. E. The relative incidence of intestinal parasites in hospital patients in Nashville and in rural Tennessee. *J. Lab. & Clin. Med.*, 19:113 (Nov.), 1933.
9. Magath, F. B. Amoebiasis. *Proc. Staff Meet. Mayo Clinic*, 8:703 (Nov. 22), 1933.
10. Sistrunk, W. E. Intestinal parasites found in individuals residing in the Northwest. *J.A.M.A.*, 57:1507 (Nov. 4), 1911.
11. Sanford, A. H. The geographical distribution of Amoebiasis. *J.A.M.A.*, 67:1923 (Dec. 23), 1916.
12. Kofoid, C. A., and Swezy, O. On the prevalence of carriers of *Endamoeba dysenteriae* among soldiers returned from overseas service. *Am. J. Trop. Med.*, 1:41 (Jan.), 1921.
- 13a. Meleney, H. E. Community surveys for *Endamoeba histolytica* and other intestinal protozoa in Tennessee, First report. *J. Parasitol.*, 16:146 (Mar.), 1930.
- 13b. Milam, D. F., and Meleney, H. E. An epidemiological study of Amoebiasis in a rural community. *Am. J. Hyg.*, 14:325 (Sept.), 1931.
14. Bishop, L. F., and Bishop, L. S. A study of Amoebiasis in New York City. *Am. J. Trop. Dis.*, 9:297 (Sept.), 1929.
15. Yorke, W., and Adams, A. R. D. Observations on *Entamoeba histolytica*. I. Development of Cysts, excystation and development of excystes amoebae (in vitro). *Am. J. Trop. Med.*, 20:279 (Aug. 13), 1926.
16. Thompson, J. G., and Robertson, A. *Protozoology, a manual for medical men* (London), 1928.
- 17a. Cleveland, L. R. Various improvements in the cultivation of *Endamoeba histolytica*. *Am. J. Hyg.*, 12, 606 (Nov.), 1930.
- 17b. Cleveland, L. R., and Sanders, E. P. The virulence of a pure line and several strains of *Entamoeba histolytica* for the liver of cats and the relation of bacteria, cultivation and liver passage to virulence. *Am. J. Hyg.*, 12:569 (Nov.), 1930.
18. Arnett, J. H., Wenrich, D. H., and Stabler, R. M. A survey of 401 College freshmen for intestinal protozoa. *Am. J. Trop. Med.*, 13:311 (May), 1933.
19. Craig, C. F. The pathology of Amoebiasis in carriers. *Am. J. Trop. Med.*, 12:285 (July), 1932.
20. Mackie, T. T., and Nauss, R. W. Familial infection by *Endamoeba histolytica* in New York City. *Am. J. Trop. Med.*, 13:577 (Nov.), 1933.
21. Bartlett, C. B. Pathology of Dysentery in the Mediterranean Expeditionary Forces, 1915. *Quart. J. Med.*, 10:185 (Apr.), 1917.
22. Hegner, R. H., Johnson, C. M., and Stabler, R. M. Host parasite relation in experimental amoebiasis in Panama. *Am. J. Hyg.*, 15:394 (Mar.), 1932.

ACKNOWLEDGMENTS—The author wishes to express appreciation to Prof. D. H. Wenrich and Dr. Robt. M. Stabler of the Department of Zoölogy, University of Pennsylvania, for assistance rendered in identification of species in question relative to interpretation of results of culture of protozoa.

Grateful acknowledgment is also hereby made to Dr. Lucy M. Crawford of the New York Hospital for most effective coöperation in procuring satisfactory fecal material, and to Josephine Wells and Elizabeth Montu, for voluntary technical assistance rendered during conduct of the latter part of this work.

An Outbreak of Epidemic Cerebrospinal Meningitis in a C.C.C. Camp*

MAJOR WESLEY C. COX, M.C., U.S.A.

Laboratory, Walter Reed General Hospital, Washington, D. C.

CIVILIAN Conservation Corps Company No. 1758 arrived at Camp in the Northeastern Section of Indian Trail Park, Dent County, Mo., on October 27, 1933, from Nashwauk, Minn., where the Company had been stationed for approximately 6 months. The Company had a strength of 3 officers and 215 junior C.C.C. enrollees, between ages of 18 and 25 years. The majority of the enrollees were housed in four 1 story, wooden barracks, 20 ft. wide by 100 ft. long, heated by wood burning stoves. Approximately 40 sq. ft. of floor space per man was allowed. The enrollees slept on standard, canvas, camp cots arranged along each side of the barracks. The cooks, truck-drivers, and special duty men were housed separately. The officers and work superintendents occupied individual rooms in officers' quarters. The forestry foremen occupied small log cabins, 2 to 3 men to a cabin.

On October 30, 1933, an enrollee who bunked in Barracks No. 2 (see Chart I), developed clinical signs of epidemic cerebrospinal meningitis and was transferred to the hospital at Rolla, Mo. The diagnosis was confirmed by the laboratory findings. This man died, November 2, 1933. The Company was placed under a working quarantine to extend for 10 days following the development of the last case of this disease. The Camp

Medical Officer examined all men daily and special care was taken not to overwork or fatigue any of the men. No secondary cases developed and the quarantine was lifted after the 10 day period had elapsed.

Upon the release of the Company from quarantine, an enrollee who had bunked next to the man who had developed meningitis and who had constantly chummed with him, received permission to move from Barrack No. 2 to Barrack No. 4 (See Chart I).

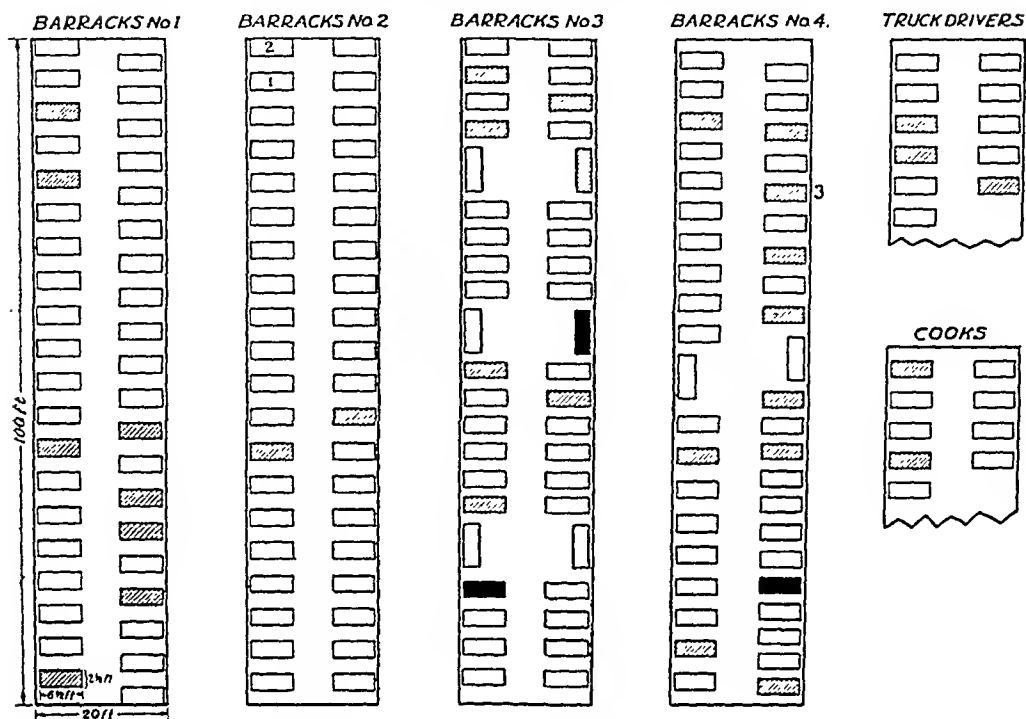
The routine work of trail making, road building and forestry was carried on by the members of the Company during the fall and winter, 1933-1934. During this period the health of the Company was excellent. Leave to visit home was granted all enrollees during the Christmas holidays and passes to visit nearby cities and communities were issued weekly. A number of enrollees were discharged in January and new men enrolled at this time.

Epidemic cerebrospinal meningitis reappeared in this camp on March 25, 1934, with the development of a single case followed by a second on March 26, and a third March 27. Five suspects were hospitalized on March 28, but none of the suspects developed the disease. Two of the patients died.

Upon notification of this outbreak, the Commanding General of the Missouri District and the District Surgeon immediately visited the camp. Instruc-

* From the Laboratory Service, Station Hospital, Fort Leavenworth, Kans.

Chart I
SCHEMATIC DIAGRAM OF BUNKING ARRANGEMENT
IN BARRACKS C.C.C. CAMP 1758



1. First case. Nov 30, 1933

2. Selectee occupying this bunk when first case developed moved to 3. Barracks 4.

■ Indicates cases of meningitis. March 1934 Outbreak

▨ Indicates carriers of *Neisseria intracellularis*. March 29 1934

Note: One selectee, a carrier slept in supply room.

Two selectees, non carriers, slept in Hospital.

tions were issued for the reduction of the overcrowding in the barracks. To accomplish this, tents were set up and the number of men in each barrack reduced from 42 to 30.

The Corps Area Commander ordered the camp quarantined and the entire company placed in working quarantine, the quarantine to extend until 10 days after the appearance of the last case of meningitis. Nasopharyngeal cultures were taken on all members of the Company in order to detect those who were carriers. All carriers found were to be cultured at intervals of 5 days until 3 successive negative cultures were obtained.

There being no laboratory facilities available locally; on March 27, the Laboratory, Station Hospital, Fort

Leavenworth, Kans., was directed to set up a field laboratory at this camp. In accordance with these orders an improvised field laboratory was set up on March 28, and all members of the Company were cultured before breakfast on the morning of March 29. Because of the long journey by automobile over rough roads, no attempt was made to transport liquid media. For this reason the rapid method of isolation of the meningococcus was not used. No transportable water bath was available so that it was not possible to set up agglutination tests at camp. Sub-cultures on blood slants were kept at 37° C. by means of hot water bottles and transported to Fort Leavenworth, where agglutination tests were set up. On each trip to Fort Leavenworth a fresh supply

of media was obtained for use in the field.

The cultures from the posterior nasopharynx were plated on medium prepared from 1 per cent glucose, beef heart, infusion agar, pH 7.8 to which laked rabbit blood was added. The plates were incubated at 37° C. for 24 hours. Typical colonies were transplanted to slants of laked rabbit blood agar. Identical colonies were stained by Gram's method, in order to eliminate all but Gram-negative diplococci. The slants were examined after 18 hours incubation, all chromogens discarded, typical cultures identified as Gram-negative diplococci, and preserved at 37° C. for final agglutination.

The total population of the camp on March 29 was 209 officers, foresters, and enrollees. A total of 33 (15.7 per cent) were found to carry the meningococcus in the posterior nasopharynx. The organism was identified as a Type II (normal) meningococcus.

The number and percentage of carriers by barracks is given in Table I. With the exception of Barrack 2, which housed the case developing in the fall of 1933, there existed a fairly uniform "barrack rate," varying from 16.6 per

TABLE II

NASOPHARYNGEAL CULTURES,
ENTIRE COMPANY

<i>Number of Men</i>	<i>Number Positive Neisseria intracellularis</i>	<i>Per Cent Positive</i>
209	33	15.7

RESULTS, NASOPHARYNGEAL CULTURES,
CARRIERS

<i>Re-culture</i>	<i>Number of Carriers</i>	<i>Positive</i>
1st Apr. 3.....	33	14
2nd Apr. 8.....	33	2
3rd Apr. 13.....	33	1
4th Apr. 18.....	15	2
5th Apr. 23.....	2	0
6th Apr. 28.....	2	0
7th May 3.....	2	0

cent to 27.2 per cent. Careful investigation revealed no differences in mode of life or association with other members of the company between the men housed in Barrack 2 and the men housed in the other barracks. It is possible that some of the men housed in this barrack developed the carrier state following their exposure to the disease in October, 1933, and that this temporary carrier state cleared up prior to March, 1934. It is impossible to state how long the carrier state had existed in the two carriers found in this barrack.

The carriers were re-cultured every 5th day until 3 successive negative nasopharyngeal cultures were obtained. Table II gives the results of this survey.

Upon detection of the carriers, the members of the Company were divided into 3 working quarantine groups. One group was composed of those non-carrier enrollees who were to be discharged shortly due to the termination of their period of enrollment. A second group was composed of non-carrier enrollees who were to remain in the Civilian Conservation Corps. The carriers formed the third group. These groups were segregated in separate barracks and tents, messes separately, and

TABLE I

NUMBER AND PERCENTAGE OF CARRIERS
BY BARRACKS

	<i>Number of Men</i>	<i>Number of Carriers</i>	<i>Percentage of Carriers</i>
Barrack 1	40	8	20.0
Barrack 2	40	2	5.0
Barrack 3	42	7	16.6
Barrack 4	42	10	23.8
Cooks	9	2	22.2
Truck Drivers... 11	3	27.2	
Officers	5	0	0.0
Foremen	15	0	0.0
Hospital	2	0	0.0
Supply Room . . .	1	1	100.0
Night Watchman	2	0	0.0
Total	209	33	15.7

worked separately. A separate latrine was provided for the carriers as were separate bathing facilities.

No cases of meningitis developed in this camp after March 27, 1934. The quarantine, except for the carriers, was lifted April 6. Eighteen of the carriers were released from quarantine April 15, and 13 April 20. Two carriers were transferred to the Station Hospital, Fort Leavenworth, Kans., for further quarantine and finally released May 6.

DISCUSSION

The case of epidemic cerebrospinal meningitis which developed 3 days after the arrival of the Company at Indian Trail Park, undoubtedly acquired the infection during the period the Company was encamped at Nashwauk, Minn.

It is possible that a healthy carrier existed among the personnel of the Company and that this carrier was the cause of the first case as well as the subsequent outbreak.

The distribution of carriers throughout the enrollees of the Company was fairly uniform, Barrack 2 in which the first case developed being the exception. It was from this barrack that an enrollee, found on the survey to be a carrier, moved to Barrack 4.

No carriers were found among the officers or foremen. This group while in constant contact with the enrollees, was housed in cabins under optimum conditions as to floor and air space.

One carrier was found in the group of 5 enrollees who were housed under optimum conditions as to the floor and air space. These men, however, visited the Company barracks, spending evenings associating with their fellow enrollees in the barracks. The carrier rate of 20 per cent for this group parallels closely the general carrier rate for the camp.

The Health Officer of the City of Nashwauk reported that there were no cases of epidemic cerebrospinal meningitis in that city or the surrounding country during the year 1933 or the first 5 months of 1934. The Health Officer of Dent County, Mo., reported that there had been no cases in that county for several years. No cases developed in the other Civilian Conservation Corps Camps in this section of Missouri, one of which was 3 miles, one 15 miles, and one 40 miles, distant from this camp. Members of all the camps in this section visited and congregated in Salem, the county seat of Dent County.

The epidemiological problem is further involved, because of the fact, that, during the Christmas holidays members of the Company visited communities in which cerebrospinal meningitis is endemic, thereby introducing the possibility of a new carrier returning to the camp. It is also possible that one of the men enrolled in this Company in January, 1934, was a carrier.

The origin of the first case of cerebrospinal meningitis and the second outbreak cannot definitely be traced. The development of the carrier state in various enrollees, following the initial case in the fall of 1933 associated with the existence of serious overcrowding in the barracks, offers the most logical epidemiological solution of the second outbreak.

The second outbreak was self limiting, no cases developing after March 27, which was 24 hours before any measures were instituted to correct the overcrowded condition of the barracks and 3 days before the carriers were separately quarantined. The eradication of the overcrowding and the isolation of the carriers until this condition cleared up undoubtedly prevented the development of secondary cases.

Constancy of Characters Differentiating Intermediates in the *Escherichia-Aerobacter* Group and their Interpretation*

EDMUND K. KLINE, DR.P.H., F.A.P.H.A.

Cattaraugus County Department of Health, Olean, N. Y.

THE choice of bacteriological methods by which organisms are to be classified within the *Escherichia-aerobacter* group offers numerous pitfalls, and whatever methods are chosen the differentiation into sections of the group will not always be sharply defined either in the laboratory or in the field.

The basic tests in most general use are methyl red and Voges-Proskauer tests, utilization of citrate as the sole source of carbon, detection of indol, and ability to grow at 46° C. (Eijkman Test). Three genera are commonly recognized as comprising the group: *Escherichia* (MR +, VP —, Cit. —, Ind. ±, Eijk. +); *Citrobacter* (MR +, VP —, Cit. +, Ind. ±, Eijk. ±); and *Aerobacter* (MR —, VP +, Cit. +, Ind. ±, Eijk. —).

While classification by means of these reactions may be challenged in the case of individual atypical cultures, and while it occasionally offers a result that is not supported by confirmatory tests, yet it seems to give a basic working differentiation of generic variations underlying the group. However, when these criteria for section differentiation

are applied there always occurs a certain percentage of organisms that apparently are bona fide members of the group, but yet are intermediate so far as differential characters are concerned.^{1, 2}

The constant occurrence of these intermediate forms can be explained in various ways. It may be that—

1. The group is so heterogeneous as not to permit strict classification into sections.

2. The strains in the group readily fluctuate in certain characters so that they vary in different environments.

3. As the bacteria in the group grow in natural conditions they are constantly dissociating into strains showing new reactions.

4. The various cultures showing intermediate reactions may not be pure strains but mixtures of two or more different strains.

It is the purpose of this paper to present certain experimental evidence bearing on these considerations tending to show that the above mentioned characters do not readily fluctuate with either changes in environment or colony morphology (dissociation), and that many of the intermediates are not mixed cultures.

The 6 experiments below, selected from a wide variety of similar experiences, illustrate the results obtained in respect to variation of differential characters.

* Read before the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

1. *Growth in Milk*—Eight various strains of the *Escherichia-aerobaeter* group were cultured in milk with daily transfers for 53 consecutive days. Every week they were tested by the various differential tests. Three cultures were MR +, VP —, Cit. —, Ind. +; 1 was the same with the exception of being Ind. —; and 4 were MR —, VP +, Cit. +, Ind. —. No variations in these characters occurred throughout the experiment although 1 culture lost its power to produce gas from lactose between the time of the 14th and 21st transfer and failed to regain this power to the end of the experiment.

2. *Growth in the Presence of Inhibitory Dyes*—In growing these organisms in lactose-peptone brilliant green broth, delayed lag phases frequently occurred.³ In one such experiment a typical *Aerobacter-aerogenes* (MR —, VP +, Cit. +, Ind. —, Eijk. —) was inoculated in a test series and delayed growth appeared in 2 tubes at 72 hours, in 2 tubes at 96 hours, and in 1 tube at 120 hours. All of these cultures were tested by the differential tests and showed no change.

3. *Growth in Cold Blooded Animals*—While studying effects of salamanders on spring water supplies,⁴ several experiments were carried out to ascertain if habitation in the gastro-intestinal tract of the salamander would change the type of *Escherichia-aerobaeter* organisms. When salamanders are placed in sterile water and starved they become free from such organisms. Salamanders were placed in large mouthed, one liter, Ehrlenmeyer flasks containing about 100 c.c. of sterile water, and every 24 hours were transferred to similar flasks. After each transfer the water was examined for the presence of the group and the organisms isolated were typed.

In one such experiment a large purple salamander (*Gyrinophilus porphyriticus*) was starved and then fed 1/10 c.c. of a 24 hour broth culture of *Escherichia coli* (MR +, VP —, Cit. —, Ind. —, Eijk. +). Organisms were obtained from the animal for 14 days thereafter and typed. The results were constant with the exception of the indol tests. Indol positive cultures were encountered in 20 of the 36 tubes showing fermentation.

An exactly similar experiment used a frog. This frog after being fed a culture of the same strain of *Escherichia coli* showed organisms for 30 days. These were typed and their reactions were again constant with the exception of indol. Indol producers were encountered in 64 of the 111 cultures.

4. *Growth on Stones Immersed in Water*—As control of the above animal experiments,

small stones were soaked in similar cultures and transferred from flask to flask of sterile water in the same manner as the animals. These experiments gave peculiar results in that in some cases the organisms died out very soon, as early as the 8th day, and in others they persisted for very long periods; in 1 case 544 days, when the experiment was discontinued.

In those experiments where the organisms died out rather promptly there was no change in type. In the experiment continued the longest the organism placed in the flask was constant in type for the first 185 days after which several atypical forms appeared.

5. *Growth in Soil*—Lengths of 3 in. stove pipe were filled with soil and carefully sterilized by repeated autoclaving. These were then joined with sterile precautions to form a pipe 20 ft. in length. All joints were taped and shellacked. Copper teats had been previously soldered to the pipe at intervals and rubber tubes and clamps were placed on these to serve as sampling points. Sterile water was introduced at the head of the pipe and permitted to seep slowly through the soil. Samples of this water drawn from all taps over a test period proved to be sterile. An emulsion (approximately a billion organisms in a liter of water) of a carefully purified culture of *Escherichia coli*, recently isolated from human feces was then run into the soil column. Thereafter, sterile water was run through the column at the rate of about 1 gal. each 24 hrs. The organism was recovered from the first tap (about 8 in. of soil) in 3 hrs., after 6 hrs. it was recovered 7 ft. from the inlet, and after 36 hrs. it was uniformly recovered from the entire length of the pipe. Thereafter it was recovered intermittently from all levels of the pipe for a period of 410 days, when the experiment was discontinued. On the 410th day organisms were isolated from the 1st and 4th taps which were exactly the same in all the above characters as the original culture. In all 726 cultures were isolated and typed from this pipe (Chart I).

6. *Effect of Dissociation*—An unstable culture of *Escherichia coli mutabile* (MR +, VP —, Cit. —, Ind. +, Eijk. +) giving rough and smooth colonies was transferred daily, roughs being picked from roughs and smooths from smooths. After 21 days the cultures gave the same reactions showing that no change in these differential characters accompanied a change in colony morphology.

PURIFICATION STUDIES

Three methods are available for the purification of cultures: (a) Repeated

TABLE I
REACTIONS OF CULTURES OBTAINED AFTER PURIFICATION

Types		Methyl Red	Voges- Proskauer	Citrate	Indol	Eijkman	Number Obtained by	
							Selective Enrich- ment	Single Cell Isolation
Escherichia	Typical	+	—	—	+	+	14	11
	Atypical	+	—	—	—	+	1	..
		+	—	—	+	—	..	2
		+	—	—	—	—	11	..
Citrobacter	Typical	+	—	+	—	—	13	11
	Atypical	+	—	+	—	+	1	6
		+	—	+	+	—	2	6
		+	—	+	+	+	..	6
Aerobacter	Typical	—	+	+	—	—	7	16
	Atypical	—	+	+	+	—	..	1
		—	+	+	—	+	..	4
		—	+	+	+	+	..	1
		Non-members					4	2
		Totals					53	66

TABLE II
TYPES OF ESCHERICHIA-AEROBACTER ORGANISMS ISOLATED FROM NATURAL HABITATS

<i>Source</i>	Escherichia	Citrobacter and Intermediate	Aerobacter	<i>Source</i>	Escherichia	Citrobacter and Intermediate	Aerobacter
Human feces	273	29	2	Prepasteurized milk	54	14	89
Bovine feces	47	6	0	Grade "A" raw milk	31	10	45
Sewage	4	0	1	Certified milk	9	2	12
Streams	65	120	71	Pasteurized milk	29	8	13
Wells	34	37	38	Hay and grain	3	4	68
Springs	66	90	52	Pasture soil	23	5	2
Salamanders	37	54	8	Totals	675	379	401

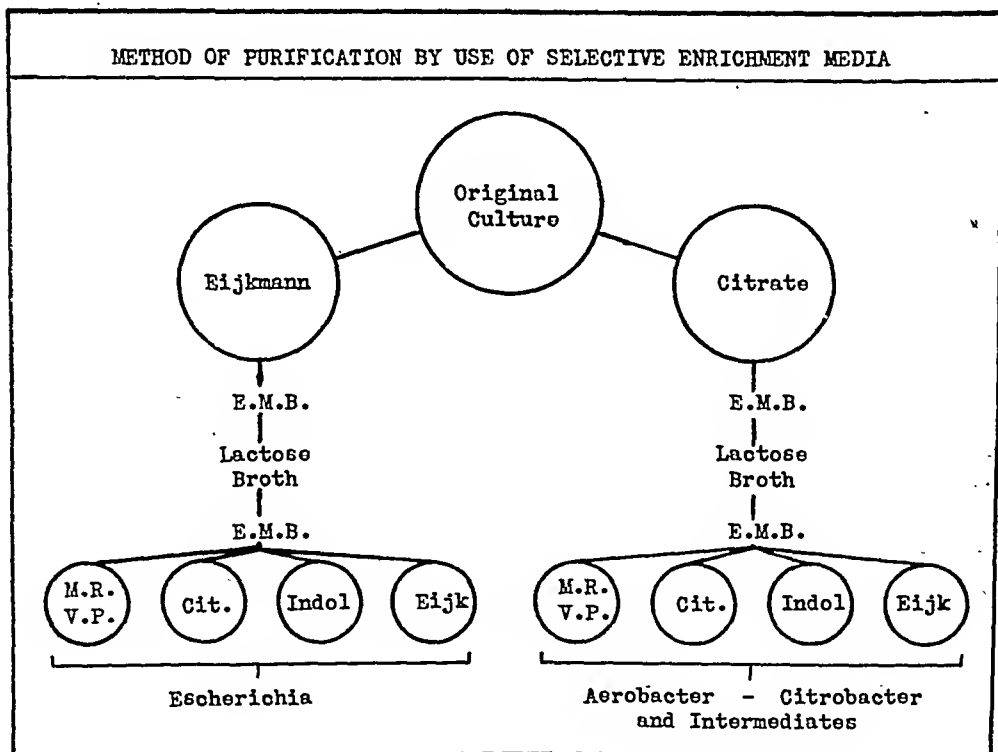
REACTIONS OF ORGANISMS ISOLATED FROM SOIL IMPREGNATED WITH TYPICAL ESCHERICHIA COLI

REACTIONS OF ORGANISMS ISOLATED FROM SOIL IMPREGNATED WITH TYPICAL ESCHERICHIA COLI																						
Methyl red	Voges-Proskauer	Curtate	Indol	Tykman	The bars indicate the approximate days of the experiment on which each type of organism was isolated																	Number of cultures
					Days of experiment																	
					25	50	75	100	125	150	175	200	225	250	275	300	325	350	375	400		
+	-	-	+	+																		5/60
+	-	-	+	-																		91
-	-	+	+	+																		18
+	-	+	+	+																		50
+	-	+	+	-																		7

picking single cells from minute droplets of emulsions or from thin agar smears of dilute emulsions. The types of organisms recovered after these painstaking purifications are shown in Table I.

There are many references in literature to show that all types of cultures can be obtained from any natural source if proper enrichment methods

METHOD OF PURIFICATION BY USE OF SELECTIVE ENRICHMENT MEDIA



are used.² Our experience confirms these general findings and shows that no special type is solely present in any given environment. The various series of cultures isolated from different habitats during our several years experience are divided among the three main divisions of the group, as shown in Table II.

DISCUSSION

The *Escherichia-aerobacter* group of bacteria consists of a few simple generic types and many intermediate forms. These intermediate forms are frequently mixed cultures but even the most painstaking methods of purification fail to reduce the group to a few standard types. All of these are comparatively stable in pure culture and do not fluctuate in regard to basic differential characters in short periods even though their environment is altered, nor do they dissociate to new types although they may show marked changes in colony morphology.

No natural environment is exclusively the abode of any single type of organism and no single type of organism is found exclusively in any natural environment. Some environmental conditions favor the development, and consequent overgrowth, of special types, and some types grow very poorly or not at all under certain environmental conditions. Therefore, mixed cultures will fluctuate with environmental changes through the overgrowth of one or the other component of the mixture.

Tests such as the utilization of citrate and the Eijkman test which have been suggested as differentiating fecal and non-fecal strains of the group do not indicate the *immediate* source of the organisms, since laboratory experiments show that any variations in these reactions were matters of long periods in altered environments.

For practical purposes a very general grouping of the various strains into

generic groups will yield all the information that can be utilized in practical field work and exact classification into smaller groups may be left to the research laboratory.

APPLICATION TO PROBLEMS OF WATER ANALYSIS

Since the *immediate* source of the various strains is not indicated by their cultural characters, interpretation of the presence of certain members of the group through such tests or groups of tests on either pure or mixed cultures is apt to lead to erroneous conclusions. However, the proportionate numbers of the various generic groups present in an inoculum may, in the future, justify drawing conclusions concerning the immediate environment through a knowledge of what environmental conditions favor the overgrowth of certain groups.

Interpretation of this knowledge will have to be based on experience, and this experience can only come after present enrichment methods are discarded and new methods developed for the recognition of sections of the group without preliminary enrichment. Future efforts to clarify the meaning of the presence of the group, both regarding laboratory methods and interpretive values, should be in this direction.

SUMMARY

Intermediate cultures of the *Escherichia-aerobacter* group isolated from natural habitats are frequently mixed cultures but careful purification studies including single cell isolations have failed materially to reduce the number of kinds of intermediates.

Strains of the group have been tested for constancy of the methyl red and Voges-Proskauer tests, utilization of citrate as the sole carbon source, detection of indol and ability to grow at 46° C. (Eijkman test). Pure cultures were grown in milk and brilliant green broth, fed to cold blooded animals,

inoculated into soil, and grown on stones immersed in water.

All the above characters were constant during weekly tests when 8 strains were grown in milk and transferred daily for 53 consecutive days. When a salamander and a frog were starved and then fed broth cultures of *Escherichia coli*, cultures recovered daily for 14 and 30 day periods respectively yielded constant characters with the exception of indol formation. Twenty of the 36 cultures (55.5 per cent) recovered from the salamander, and 64 of the 111 cultures (57.6 per cent) recovered from the frog were indol positive.

Sterilized soil which was held in a 3 in. stove pipe 20 ft. in length was inoculated with a carefully purified culture of *Escherichia coli*. Sterile water was permitted to seep slowly through the soil for 410 days. Of 726 cultures isolated at various sampling points during this period, 560 cultures (77.1 per cent) retained the same characters as the original culture (MR +, VP —, Citrate —, Indol +, Eijkman +). The remaining 166 cultures (22.9 per cent) varied in respect to the methyl red, citrate or Eijkman tests, but no variation occurred before the 47th day. The fact that 75 cultures (10.3 per cent) isolated after the 95th day were able to utilize citrate as the sole source of carbon suggests that citrate fermenting forms may be strains

of species in the genus *Escherichia* and that there may be no justification for classifying them in a separate genus (*Citrobacter*).

While the results of these studies indicate that different environmental conditions result in changes in the characters of members of the *Escherichia* group, particularly with respect to indol production, the utilization of citrate and the Eijkman test, the complete persistence of the characters which differentiate *Escherichia* from other types of colon organisms in changed environments in a large percentage of the cultures for long periods of time shows that as an index of fecal pollution, reliance should be placed on the identification of this species rather than to expect these variable tests to indicate the *immediate* environment from which the organism is isolated.

REFERENCES

1. Kline, Edmund K. The Colon Group of Bacteria in Milk. *19th Annual Report of the Int. Assn. of Dairy and Milk Inspectors*, 1930.
2. Ruchhoft, C. C., Kallas, J. C., Chinn, Bernard, Coulter, E. W. Coli-aerogenes Differentiation in Water Analysis. *J. Bact.*, XXII, 2:125 (Aug.), 1931.
3. Kline, Edmund K. Toxicity of Brilliant Green for Certain Bacteria. *A.J.P.H.*, XXV, 3:314 (Mar.), 1935.
4. Kline, Edmund K., and Fuller, Nelson M. Interpretation of Laboratory Findings in Rural Spring Water Supplies. *A.J.P.H.*, XXII, 7:691 (July), 1932.

NOTE: Parts of this study were aided by an allotment of funds through the Division of Research, Milbank Memorial Fund.

Fevers of the Typhoid Group in Members of the Civilian Conservation Corps During 1934

GEORGE F. LULL, M.D., DR.P.H.

Lieutenant Colonel, Medical Corps, U. S. Army, Statistical Subdivision, Surgeon General's Office, Washington, D. C.

THE incidence of fevers of the typhoid group among enrollees of the Civilian Conservation Corps was the subject of a brief report¹ published in this *Journal* some months ago. During 1934 data have been collected relative to this group of fevers among the large body of males of susceptible age who are working, largely in rural communities, scattered about in over 1,000 camps.

There were 79 cases reported during the year, one of which was called paratyphoid "A," but the diagnosis was not substantiated by anything more than agglutination tests. The patient had received a vaccine containing the paratyphoid "A" fraction so he has been considered among the typhoid cases. One other case was a para "B" infection.

The enrolled strength of the C.C.C. on January 1, 1934, was 278,517. The enrollees are taken in for 6 months' periods which terminate at the end of March and September, so that there is 1 group exposed for 6 months and 2 additional groups exposed for 3 months each. During 1934 there were nearly 400,000 different individuals enrolled, and hence exposed to infection.

The contents of the typhoid vaccine were altered during the year. The old type vaccine contained 750 million

typhoid and 250 million paratyphoid "A" organisms. New vaccine was issued during the first quarter of the year so that all enrollees entering after April 1 received a vaccine containing 2,000 million typhoid and no paratyphoid organisms.

An analysis of the 78 cases shows that 41 received the new vaccine and 23 the old; 13 received 2 doses of the old and 1 of the new; and 1 case received 1 dose of the old and 2 of the new.

Many of these cases were treated in rural hospitals where laboratory facilities were not available for bacteriologic work, so that the diagnosis was based on the clinical findings only. This was true in 48 of the cases, while in 30 the causative organism was obtained from blood, feces, or urine, and proven bacteriologically.

The following was found to be the relation of onset of the disease to time of immunization:

Number sick before being vaccinated	6
During the 1st month following vaccination	5
Between 1 and 3 months following	29
Over 3 months	38

Cases were reported from all corps areas except the Sixth, which comprises the States of Illinois, Wisconsin, and Michigan. By states the distribution was as follows:

	Cases
Idaho	23
Tennessee	22
New Hampshire	6
Arizona	4
Maine	3
Massachusetts	3
Texas	3
Mississippi	2
Kentucky	2
Vermont	1
New York	1
Virginia	1
West Virginia	1
Arkansas	1
Minnesota	1
North Dakota	1
Colorado	1
New Mexico	1
Oklahoma	1

There were 2 outbreaks of considerable size, one at LaFollette, Tenn., and the other at Avery, Ida.

The outbreak at LaFollette occurred in a company recruited from New York City and the urban region of northern New Jersey. The first case appeared on June 13, 1 on June 14, 1 on June 16, 2 on June 17, 3 on June 25, the last appearing on June 28—15 days after the first. An investigation showed that typhoid had existed in the community and that cases had occurred in the families of 2 farmers living near springs the water of which had been used by the men contrary to orders. Milk had been purchased directly from a number of farmers by individual enrollees. In 11 of the cases the causative organism was isolated. All recovered.

At the camp near Avery, Ida., the first patient became ill on July 21, and up to August 19 there were 19 cases with 1 death. The source of this outbreak is thought to have been an infected water supply.

The only case of para "B" infection occurred in an enrollee in New Hampshire. This man had not been out of camp for a month prior to his illness and there were no other cases either in the camp or in the civilian community near by. Bacteriological examinations were all negative except serum agglutination which was positive for B in dilutions of 1 to 6,400, while it agglutinated *B. typhosus* in 1 to 20, and paratyphoid "A" in 1 to 80 only. The case terminated in recovery.

There were 6 deaths among the 79 cases, a fatality rate of 7.69 per cent. Three of these deaths were in Idaho, and 1 each in Maine, Kentucky, and Texas. One fatal case was admitted to hospital 5 days after his first dose of vaccine, another 2 weeks after completion of prophylaxis, and the 4 others at various times from 2½ to 7 months after vaccination.

The incidence and death rates based on an average strength of 292,698 were 0.27 and 0.02 per 1,000, respectively. If we consider these rates based on the number of individuals exposed, they would be 0.20 and 0.015.

REFERENCE

1. Lull, G. F. *A.J.P.H.*, XXIV, 6:631 (June), 1934.

Child Care in Vienna

E. V. THIEHOFF, M.D., F.A.P.H.A.

Health District No. 7, Gladwin, Mich.

IN spite of the present crisis in Austria, Vienna is setting an example for the rest of the world in caring for her children. Realizing that this crisis proves most destructive to family life, the city of Vienna has taken over the care of her needy children, offering them not only a helping hand but in many cases a happy home.

The man who instituted and who was in charge of this work is the famous anatomist, Dr. Julius Tandler, formerly Chief of the Social Welfare Department of the Municipality of Vienna. He linked his name with the whole of public welfare in Vienna. His fundamental ideas have set high standards for all of Europe.

When the writer was in Vienna, one of the first places visited was the Jugendamt (District Child Welfare Center) on Laudongasse. The Municipal Youth Welfare Department is one of the municipal offices which deal with public welfare and social betterment. This department has divided the city of Vienna into 32 child welfare districts, each with its own office. Each center handles, on an average, 2,000 or more children. An interview with one of the directors in the Laudongasse center revealed that there are several directors in each center, each having under his care approximately 400 children.

Through these centers the care of illegitimate or mistreated children is supervised. All illegitimate children are registered immediately after birth. An attempt is made to determine paternity

and if able, the father must contribute to the child's support. If the parents are not employed, the city pays for the child's care. The center has general supervision of the child. A physician, dentist, and nurse are present two afternoons a week to examine children and safeguard their health. No treatment is given. If such is needed, the children are referred to free clinics. The parents are required to come into the center frequently for conferences. Women public health workers, Health Visitors of the Municipality, as they are called, make visits to the schools and homes to determine how the children are progressing, and if they are being properly treated. The center sees that the child, arriving at school age, is placed in a school, starting with a kindergarten. Parents not caring for their children properly are brought before a judge. People wishing to care for a child may obtain one through the center. Complete records of each child are kept on file in the center office.

Another child caring institution visited was the "Kinderübernahmestelle" or Municipal Reception Institute for Children. It is in effect an orphans' home conducted by the city of Vienna, a home for deserted, mistreated, illegitimate children or the children of parents who cannot care for them. Here the children are kept for 6 months and then returned to their homes. If a child has no home an effort is made to find a suitable home for him. The building itself is modern and well arranged, with a capacity of 200. Only well children

are housed. Sick children are sent to a nearby Children's Hospital. The rooms are divided into sections, one for infants under 1 year of age, one for children 1 to 2 years old, one for children 2 to 6 years old, and a section for older children.

Of late years there has been a building trend in Vienna—not of churches, museums, palaces or monuments, but of living quarters for the masses. This started soon after the socialists came into power. Within the last 10 years the city has erected modern tenements for 60,000 families of the laboring class. Probably the best known of these is the Karl Marx Hof, consisting of two large units built around beautiful courts. It provides homes for 5,000 persons or 1,400 families. Thus, Vienna has not only provided modern homes for poor children, but has gone a step further and included kindergartens in many of them. Here children from 3 to 6 years of age spend the day in attractive rooms under expert care, which is a great aid to families where both parents work during the day.

The Vienna Municipal Kindergartens or Infant Schools are a part of the welfare activity of the city. The Town Council has entrusted their management to the Municipal Youth Welfare Department.

Since the World War the kindergarten system has been greatly developed by the municipal government. After the war the 57 kindergarten schools were converted into so-called "Volkskindergärten," the hours originally from 9 A.M. to 12 noon and from 2 P.M. to 4 P.M. being extended from 7 A.M. to 6 P.M. This necessitated feeding the children at school. At first breakfast was supplied by the Dutch Relief Scheme and lunch by the American Child Relief Scheme, but since 1922 the municipality has supplied the meals.

In 1934 Vienna owned 114 kinder-

gartens. These are divided into over 300 groups, each group averaging 30 children. The children are mostly drawn from the laboring classes. They are accepted from homes where both parents are away at work all day and where there are poor housing or bad social conditions, endangering the physical and mental development of the child. These children are sent to kindergartens by the District Child Welfare Centers previously described. The contact between the center and the kindergarten is made by the Health Visitor who visits not only the school but also the home. The Kindergarten superintendent has the right to fill vacancies. About half of the kindergartens are held in the municipal dwellings, one-fourth in school buildings, one-fourth in their own buildings, and very few in private houses. Most of the kindergartens are open during the entire year. Great care has been exercised in equipping and furnishing them. The furniture is in proportion to the size of the child. Each school has a terrace, a garden and an open-air playground.

Each kindergarten is divided into groups or classes, the newer schools consisting of only two to four groups. It is felt that the smaller kindergartens are better than the larger where danger of infection is greater. All groups consist of boys and girls, irrespective of age. Formerly they were grouped according to age.

A combination of the Montessori and Froebel principles is used, the best of these two theories being united. The school day is so divided that education, work, and play are brought into proper relation to each other. An attempt is made not only to supply a happy home during the day, but also to make the child better able to associate with others in a group. The teachers outline their work each day but it is not a fixed program, as the children are allowed

some choice. Exhibitions are given annually to display the articles the children have made.

Teaching requirements are very strict. By act of Parliament it has been decreed that only women who have completed courses of instruction in a college for kindergarten teachers will be employed. Of these colleges there are two private schools, one municipal school, and one school of the federal government. In addition to this teachers must have had at least 3 months of practical experience in a public kindergarten. Opportunities are offered for teachers to receive advanced education.

Superintendents are chosen from among former teachers, promoted because of exceptional ability. Their duty is the administration of the kindergarten. They have control over the teachers and assistants and are responsible for their work. All of the superintendents have monthly conferences together.

Medical control over each kindergarten is exercised by a physician who examines each child upon entrance to the school and at frequent intervals. He keeps complete health index records for each child. Any child needing treatment is referred to the proper clinic.

Expenditures for the municipal kindergartens have been increasing year by year with the growth of the system. The only revenues are the contributions made by the parents. The fees are very low. During the present economic crisis only about 16 per cent of the parents have been able to pay even these low fees, while about 24 per cent pay from one-fourth to one-half of the fee. Sixty per cent do not pay anything, the city covering this loss.

Each kindergarten has its "Parents' Association," the purpose of which is to support the work of the school.

One of the last places visited in

Vienna was the beautiful "Sandleiten" Kindergarten, the one-hundredth of these model institutions. It is located in the hilly district on the outskirts of the city near the Vienna Forest. This is a new part of the city and not so long ago was a sandy, waste area, from which "Sandleiten" derives its name. Now this district contains one of the new blocks of municipal dwellings, and here is Sandleiten, the finest kindergarten in Vienna.

At the entrance one is greeted with the words of Dr. Tandler:

"Give to the Child Beauty and Joy.
Childhood Impressions live forever."

Certainly one receives impressions of beauty and joy within.

Adults are allowed to accompany the children only to the doors. Visitors are admitted only by card and then must don cloth overshoes. Thus, every precaution is taken to safeguard the health of these little children.

The reception hall resembles a large picture book as Professor Arthur Brusenbauch has painted beautiful frescoes on the walls and ceilings. These depict events which make the life of children happy.

First the child passes down broad, light hallways to the cloakroom. Here each child has his own hook and locker and here he changes from street clothes to shoes and rompers furnished by the kindergarten. Each child knows his things by a picture sign (a rabbit, a bird, a flower, etc.). In addition, one group of children wears blue shoes and rompers while another wears red. Those dressed in blue know they are to go to the room painted blue with a blue gentian flower painted on the floor while those in red go to the adjoining room painted red and with a red poppy design on the floor.

Next the children must go to the toilet and then wash and clean their teeth. Following this they go to their

playroom where they clean and tidy up their doll houses, feed the canaries, and give the gold fish fresh water. This work being accomplished, they have their gymnastics. The morning exercises follow the rules of modern gymnastics for these small children.

After washing, breakfast is served. The children take turns in serving each other. They learn good table manners. Now it is time for play. The little ones are guided into certain games by the teacher. Songs are sung and stories are told. There is work too with different materials such as crayons, scissors, etc. Soon it is dinner time. Before eating the children must again visit the toilets and wash. Meals are supplied by the Vienna Public Kitchen Service. The meals are prepared according to the famous "Nem" system of Professor Klemens Pirquet which allows, by special calculation, all the calories and vitamins necessary to a child's growth. If any child has a birthday it is celebrated with lighted candles and a plate of sweets. After dinner the room is made tidy and the dishes are washed.

It is now time to rest. The children

lie on little woven straw mats, which in summer time are placed out of doors on the terrace.

The rest period is followed by another period of play and work, the latter in workshops where the larger children are taught to handle tools while the smaller ones build in sand boxes.

In summer the children spend most of their time in the garden. Each group has its own playground and sand box. There are garden tables with gay sun-shades where the children may eat. The wading pool affords much healthful exercise.

Altogether the kindergarten promotes the natural development of these little children. It gives to the children what they would have to go without at home—a sense of order, a community spirit, independence, pleasure in work and play, cleanliness, and culture. Thus, is justified the effort of the Vienna Municipal Kindergarten system which has set the pace for others. One must admire the city of Vienna to have found the courage, the will, and the means, in spite of her many difficulties, to make possible these kindergartens as a protection for her youth.

Function of the Laboratory in the Epidemiological Control of Syphilis*

CHARLES W. ARTHUR

Director of Laboratories, Department of Health, Pasadena, Calif.

WHILE this Association has been traveling to and holding its Annual Meeting, probably somewhat more than 7,500 cases of syphilis have been added to the present year's morbidity totals for the United States. The annual incidence of this disease as reported to public health agencies continues at such a relatively constant level that there is little to indicate much progress in its control. The number of unreported cases is unknown. There are no mysterious factors relating to the disease which are at all responsible for this failure to achieve a lowered incidence. It is not a lack of knowledge but a question of coöperative effort, and among the reasons which have been advanced to explain the continued prevalence of the disease are: the failure of health agencies to provide adequate laboratory and clinical facilities for the diagnosis and proper treatment of known cases and the more or less utter neglect in checking up on sources of infection and significant contacts; the frequent failure of physicians to report cases; the failure of some individuals to seek medical advice or apply for treatment while they are in the early and infectious stage of the disease; and the lack of coöordinated effort where

some communities in which a sound control program is attempted are surrounded by areas in which few if any preventive measures are applied.

There is some indication that the lay public is becoming more appreciative of this problem. However, even with smallpox, the educational method alone has never proved sufficient and only those areas have largely been free of variola where health consciousness has made it possible to pass compulsory vaccination legislation. As recently as 1924, an epidemic of 116 cases occurred in this community, paralleling an outbreak of proportional incidence in the metropolitan area—a by-product of free choice in the matter of vaccination. As commendable and necessary as is the educational approach, there is urgent need for a more vigorous application of medical and epidemiological methods, on a national scale, if the incidence of syphilis is to be reduced.

It is recognized that provisions for the control of this disease vary markedly in various sections of the country. However, where there is a balanced program with the physicians in private practice and public and private agencies sharing the responsibility of control, a more efficient use of available facilities results. An advisory medical committee coöperating with the health department can give very valuable support to any public health program. We have had this experience locally

* Read at a Joint Session of the California Association of Dairy and Milk Inspectors and the Laboratory Section of the American Public Health Association at the Sixty-third Annual Meeting in Pasadena, Calif., September 6, 1934.

especially during the recent poliomyelitis epidemic. With the coöperation of a number of physicians, and through the efforts of the department, at times it has been possible to obtain multiple blood specimens over a period of weeks from significant contacts with infectious syphilitics. There are many individuals who, when treated with consideration under such circumstances, are coöperative. Thus a few cases have been discovered in which the acquisition of the spirochetes was not suggested from gross examination, and the prompt treatment of these patients has undoubtedly been one means of preventing a few new infections. In one such instance, very recently, on the third examination positive tests were found both by complement-fixation and by precipitation, at a time when no local lesion had been discovered. The early treatment of this case which conceivably could have progressed to late syphilis without detection will undoubtedly be of paramount value to the individual, besides representing the control of a potential source of new cases.

The system of reporting the disease by number has often been an obstacle even though it is argued that where names and addresses are required there is an even greater tendency to conceal cases. Reports from several areas indicate that from 40 to 60 per cent of known patients are treated in clinics, hospitals, and state institutions. The names and addresses of these individuals are even now on records available to the health authorities and we hear of no objections either from the patients, the institutions, or the physicians in attendance. The effects of syphilis on the human race are certainly no less serious than are those of poliomyelitis, yet no health department would fail to make an immediate investigation of every case of the latter disease and record all pertinent epidemiological data. If, therefore, the

names and addresses of approximately one-half of the individuals now being recorded as syphilitic are available, there is a working basis for possible results which is a challenge to public health consciousness. Many private physicians have a sincere interest in this problem and are willing to coöperate to the fullest extent with the official agencies. Most of the blood specimens submitted to our local public health laboratory, amounting to more than 3,500 a year, not only by the clinics and hospitals, but by the individual physicians, carry the names of the patients. This frequently serves as an early lead on an infectious case.

Every private, clinical, and hospital, as well as every public health laboratory should be required to report its positive Wassermanns, precipitation tests, and dark-field examinations promptly to the nearest official health department, in addition to the responsibility of physicians in reporting the cases later. The laboratory is an important unit in the epidemiological control of syphilis. At the present time, blood specimens are submitted for examination from the great majority of suspected individuals who seek medical advice, and, except for patients with very early primary lesions, practically all cases of significance to the epidemiologist are sero-positive. During the last 3 years, a greater number of dark-field examinations have been made in the local laboratory than previously. This could be interpreted as indicating an increase in syphilis, but it is not associated with an increase in the incidence of cases reported. We believe that the public is developing a better understanding of the disease and that the great value of early diagnosis and prompt treatment is more generally recognized. Recent publicity even in the newspapers and by radio, with many favorable comments, shows a growing interest. Health officials should be

cognizant of this slow but apparent change in attitudes and make every effort to profit from it by progressing beyond the present more or less inactive statistical period to a more active epidemiological endeavor in the control of syphilis.

REFERENCES

- Nichols, H. J. *Carriers in Infectious Diseases*. Williams & Wilkins,
 Parran, Thomas, Jr. The Eradication of Syphilis. *J.A.M.A.*, 97, 2:73 (July 11), 1931.
 Kiser, E. F., and Bohner, C. B. Incidence of Syphilis in Private Practice. *J.A.M.A.*, 98, 19:1631 (May 7), 1932.
Annual Reports, Pasadena Health Department, 1924, 1933.

Some Interesting Statistics on New York City

THERE has been received from the Department of Health of the City of New York through Dr. C. F. Bolduan a small pamphlet containing some very interesting statistics on the city, and extending over a long period of years. The data show a most marked decline in the birth rate in the last 37 years. In 1898 the birth rate was estimated (figures incomplete) to be 36 per 1,000 population. In 1910 the rate was 26.95, in 1920, 23.37, in 1930, 17.64, and in 1934 the rate reached the low figure of 13.55.

The infant mortality rate (deaths under 1 year per 1,000 live births) has shown a remarkable decrease, being 140.9 in 1898, 113.38 in 1910, 85.36 in 1920, 57.24 in 1930, and 52.22 in 1934. In 1932 the rate was 50.91. Whatever factor the decreasing birth rate may be in reducing the infant mortality rate, there must have been many other factors centering in improved maternity and infancy hygiene to account for such a decided reduction.

A most interesting graph shows how the composition of the city population is changing as to its age grouping.

Per Cent of Population	1900	1910	1920	1930
Under 15 years	30.7	28.7	28.4	24.4
15 to 44 years	53.4	54.8	52.5	54.5
45 and over	15.9	16.5	19.1	21.1

The proportion of population under 15 years is now only about four-fifths what it was 30 years ago. A change might be expected in view of the decreased

birth rate. A table shows how in the last 30 years the death rates for males and females in different age groups have varied—the rates in the lower age groups showing marked decreases, for example, the rates for under 4 years is now less than one-third, for both males and females, of what it was 30 years ago.

An attractive graph covering a period of 130 years indicates how comparatively free the city now is of the epidemics which at different times swept over it, when death rates per 1,000 population at different times reached the high point of almost 50, with a general rate practically never less than 20 until the year 1895. In contrast, in recent years, even during the influenza epidemic in 1918, the death rate did not get beyond 17, and for 1934 the general death rate is 10.2.

Another diagram shows the 5 leading causes of death for a 3 year period (1932–1934) for the different age groups. The leading cause under 1 year is premature birth; 1–4 years, pneumonia; 5–9, accidents; 10–14, heart disease; then 15–19, 20–24, 25–29, and 30–34 all have tuberculosis as the leading cause; for the remaining age groups circulatory diseases stand first.

The pamphlet concludes with figures and rates for a number of causes of death for the last 30 years.

Copies of the interesting pamphlet may be obtained from New York City Health Department.
 J. W.

Various *Bacillus Typhosus* Antigens Used for the Macroscopic Widal

MAURICE R. MOORE, M.D., C.M.

The William W. Backus Hospital Laboratory, Norwich, Conn.

DURING the past 4 years I have observed on a number of occasions that if different Widal antigens were tested against the same blood serum, markedly different results might be obtained. Because of the confusion which these discrepancies created in my mind, I decided to compare various Widal antigens of *Bacillus typhosus* which were available on the market; also a "live" antigen and an "O" antigen.

The Connecticut State Laboratory, Hartford, and the Department of Public Health, Boston, very kindly supplied excess blood serum from their routine work which showed a positive Widal reaction. A few sera were obtained from our own laboratories.

Six antigens were used, 4 of which were purchased from leading supply houses. One of the 4 was later discontinued due to the prohibitive cost. Two were made in our laboratory; the "live" antigen according to the method of preparation employed by the Connecticut State Laboratory, Hartford; the "O" antigen according to the method used in the New York State Laboratory.

All Widal's were incubated 3 hours in a water bath at 56° C., and a reading made at the end of the incubation. They were then placed in a refrigerator over night and a final reading made the next morning. No tests were reported unless the controls were satisfactory.

The work was done by one technician

in order to have the results as uniform as possible. Each serum was tested with all the antigens, unless there was not a sufficient amount available, in which case as many as possible were set up.

DISCUSSION

The "live" antigen gave a reaction in 100 per cent of the sera of this series; the "O," 94.4, and the others varied from 78 to 85.7 per cent. This shows the number of total negative findings to vary from 0 to 22 per cent. If one accepts as a criterion that a Widal is negative if the reaction is positive to a dilution of 1:80 and negative in all other dilutions, the total number of successful reactions of antigen No. 1 were 46.4 per cent; No. 2, 34.1; No. 3, 50; No. 4, 34.4; "live," 56; "O" 47.2. This shows the number of positive Widal's to vary from 34.1 to 56 per cent—a variation of 21.9 per cent.

A comparison of the above figures reveals the same variation in results within 0.1 per cent, whether one considers the reaction at a dilution of 1:20 or 1:80.

The percentage of disagreement between the 3 hour and over night reading has a range of 35.5. This difference is more apparent than real. Fourteen times in 179 tests (7.8 per cent) the 3 hour reading was such as to have been interpreted as a negative, and the over night reading as a positive

Widal—7.8 per cent is too large a figure to be disregarded, and one must invariably wait for the over night reading before giving a negative report.

The type of floccule met throughout is tabulated in detail in the summary. I desire to comment on the similarity of the "O" and "live" antigens. The "O" gave no positives with large floccules persisting throughout and the "live" in only 2.4 per cent of the reactions. The formalin-treated antigens gave the coarse granules in 19.2 to 41.7 per cent of the tests. Antigens Nos. 1, 2 and 4 produced very fine granules in 8.8–15.4 per cent; No. 3 alone failed to give this type of floccule.

In this series of tests the "live" antigen is superior to the other antigens. The "O" is slightly less efficient than the "live" but is definitely superior to the formalin treated type. There is no doubt that a dead antigen has a decided advantage over a "live"

for smaller laboratories which are not doing the Widal frequently. The dead antigen is always available and therefore permits the reaction to be carried out immediately upon request. In contrast, the "live" antigen requires a definite interval for growth before it may be used. The "O" antigen has the advantage of being a dead antigen, and in this experiment has shown an efficiency approaching that of the "live."

One hopes that this communication may encourage the work that is being done on the "O" antigen in other laboratories. It is possible that in time the alcohol-treated antigens may partially replace the formalin-treated types.

SUMMARY

1. A total of 205 tests was done.
2. Six different *Bacillus typhosus* antigens were tested on 45 different samples of human blood serum.
3. The serum used had been previously

SUMMARY

	No. 1	No. 2	No. 3	No. 4	"Live" Antigen	"O" Antigen
Total No. of tests done.....	41	41	14	32	41	36
No. of times negative.....	7	9	2	6	0	2
No. of times the reaction discontinued at a dilution of 1:20 (questionable reactions [\pm] will be disregarded)	1	3	0	2	2	3
No. of times the reaction discontinued at a dilution of 1:40	11	6	1	7	7	6
No. of times the reaction discontinued at a dilution of 1:80	3	9	4	6	9	8
No. of times the reaction discontinued at a dilution of 1:160	6	5	2	1	7	7
No. of times the reaction discontinued at a dilution of 1:320	4	3	1	4	6	1
No. of times the reaction discontinued at a dilution of 1:640	5	4	3	2	3	7
No. of times the reaction discontinued at a dilution of 1:1,280	4	2	1	4	7	2
No. of times the 3 hour and over night reading agreed	9	13	4	14	6	3
No. of times the 3 hour and over night reading disagreed	32	28	10	18	35	33
No. of times the floccules were coarse throughout	8	7	5	5	1	0
No. of times the floccules were fine throughout..	4	4	3	5	9	7
No. of times the floccules were very fine throughout	3	4	0	4	12	9
No. of times the floccules were mixed in size....	19	17	4	12	19	18

found to give a Widal reaction with some type of antigen before being used for the experiment.

4. The number of complete failures varied from 0 to 22 per cent.

5. The positive reactions varied from 34.1 to 56 per cent.

6. The "live" antigen was the most efficient antigen used.

7. The alcohol-treated "O" antigen in this series of tests proved definitely more efficient than the formalin-treated types.

8. One considers that the type of Widal

antigen on the market should be regulated by a central authority and suggests that head of the state public health laboratories as the reasonable choice for such supervision.

NOTE: I desire to take this opportunity to thank Friend Lee Mickle, Director of the Connecticut State Laboratories, and Edith A. Beckler, Bacteriologist, Department of Public Health, Boston, for their kind coöperation in supplying me with immune blood sera. Also, I want to express my appreciation to Elizabeth P. Lathrop for her persistent care and patience in doing the technical part of the experiment.

National League of Nursing Education

THE Forty-first Annual Convention of the National League of Nursing Education (Effie J. Taylor, *President*) which was held at the Hotel Roosevelt, New York, N. Y., June 3-8, had a registration of 1,223, the largest in the history of the organization.

The meeting marked the 75th anniversary of the founding of the Nightingale School in London, England. A large mass meeting was held at Carnegie Hall to celebrate the occasion.

The entire program was centered about schools of nursing, and particularly about the reconstruction of the nursing school curriculum which is one of the chief League projects now under way. Changes which are necessary to prepare the nurse so that she may meet the needs of the changing order were discussed. These included changes in standards, educational aims, methods of instruction, curriculum structure, pattern, and content. A symposium on clinical instruction as a method of teaching was demonstrated by members of the faculty and students of Yale University.

There was a session on the control and support of nursing schools, another on ways of securing adequate clinical experience in communicable diseases, including tuberculosis, and psychiatric nursing, and nursing experience with a

public health agency. The subject of the child, the community, and the nurse was ably presented by Winifred Rand, Instructor in Parent Education, Merrill Palmer School, Detroit, and Dr. Jesse Williams, Professor of Health Education, Teachers College, Columbia University.

Among those who participated in the program were George A. Works, Professor of Education, University of Chicago; Dr. C.-E. A. Winslow, Professor of Public Health, Yale University; Dr. Willystine Goodsell, Professor of Education, Columbia University; Dr. Milton Charles Winternitz, Dean of the Medical School, Yale University; and Alphonse M. Schwitalla, Dean of the School of Nursing, St. Louis University; Isabel M. Stewart, Professor of Nursing Education, Teachers College; Nellie X. Hawkinson, Professor of Nursing Education, Chicago University; Effie J. Taylor, Dean of the School of Nursing, Yale University; Margaret Tracy, Director of the School of Nursing, University of California, and many other nurse educators.

A special feature, an innovation at the convention, was a luncheon for nursing school board and committee members.

The 1935 award of the Walter Burns Saunders Memorial Medal, given for distinguished service in nursing, was made to Adda Eldredge of Chicago.

Analysis of Public Health Expenditures by Geographic Subdivisions*

W. F. WALKER, DR.P.H., F.A.P.H.A. (*Life Member*)

*Director, Division of Health Studies, The Commonwealth Fund,
New York, N. Y.*

PREVIOUS articles dealing with current health department practices, as viewed by the sub-committee on Current Health Department Practices of the Committee on Administrative Practice, have dealt with the idea of developing a general information service, the principal sources from which information may be currently secured, and a discussion of personnel and expenditures of official health agencies in cities of various sizes. In the present article, consideration will be given to the variation in gross expenditures for public health purposes in 6 geographic subdivisions of the country and the distribution of expenditures for the principal services in these same geographic subdivisions. As has been previously pointed out, a very convenient source of information regarding expenditures and to a degree current program, exists in material filed by cities of 20,000 and over in connection with the Inter-Chamber Health Conservation Contest carried on jointly by the American Public Health Association and the Chamber of Commerce of the United States. Though the number

of cities entered annually in the Contest has varied from 108 to 276 during the 5 years in which it has been conducted, 53 cities have reported annually since 1930 through this channel in considerable detail regarding local health activities and costs.

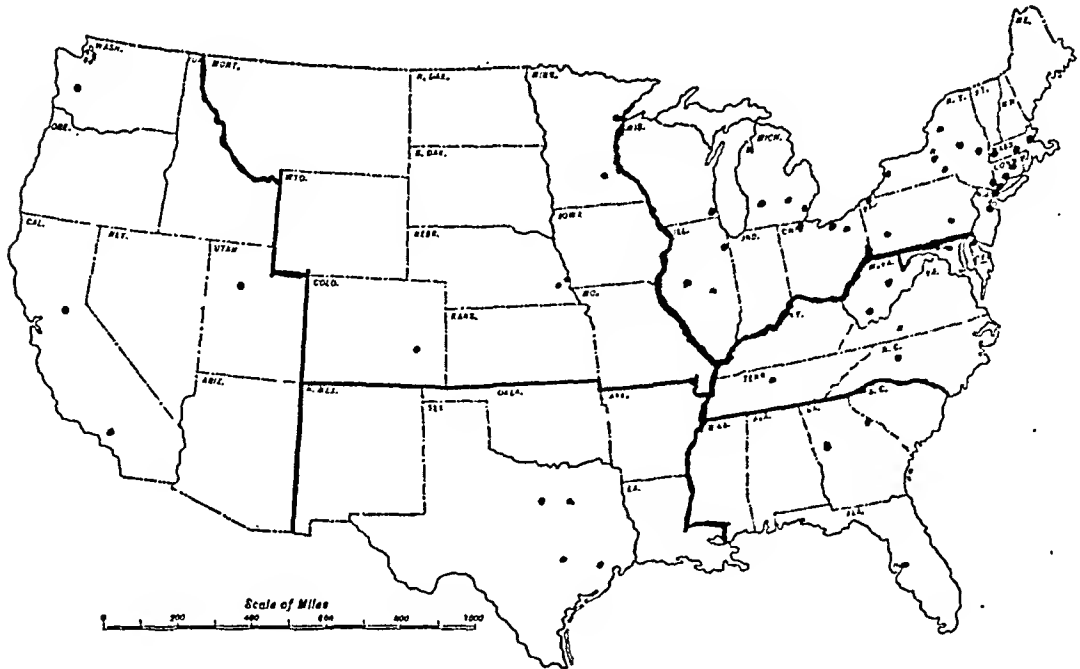
The committee in charge of the Health Conservation Contest has divided the country into 6 divisions in which it is felt the health problems are sufficiently alike to permit the grouping of experience. Figure I indicates the states included in each of these 6 divisions and the location of the 53 cities listed which provide the material for this analysis.

In Table I is shown the total number of cities of over 20,000 population in each of these geographical districts, the total population of these cities, the number and percentage of cities for which we have information concerning their experience over the 5 year period, the population of reporting cities in each district, the percentage which this population represents of the total urban population of the area (in cities over 20,000). It will be noticed that in the eastern district, the sample represents nearly 35 per cent of the total population and 17 per cent of the cities. In no instance is less than 10 per cent of the cities represented, and only in the western district does the

* Third article based on Report of Sub-committee on Current Practices of Health Departments of the Committee on Administrative Practice. The members are: Joseph W. Mountin, M.D., *Chairman*, E. L. Bishop, M.D., Louis I. Dublin, Ph.D., Allen W. Freeman, M.D., George T. Palmer, Dr.P.H., and John L. Rice, M.D. Former articles appeared in March and May Journals.

FIGURE I

GEOGRAPHIC SUBDIVISIONS AND LOCATION OF REPORTING CITIES

*Northeastern*

Hartford, Conn.
 New Haven, Conn.
 Greenwich, Conn.
 Decatur, Ill.
 Evanston, Ill.
 Peoria, Ill.
 Brookline, Mass.
 Pittsfield, Mass.
 Springfield, Mass.
 Detroit, Mich.
 Flint, Mich.
 Grand Rapids, Mich.
 Newark, N. J.
 Auburn, N. Y.
 Buffalo, N. Y.
 Queens, N. Y.
 Syracuse, N. Y.
 Utica, N. Y.
 Yonkers, N. Y.
 Binghamton, N. Y.
 Schenectady, N. Y.

Watertown, N. Y.

Akron, O.
 Lakewood, O.
 Toledo, O.
 Pittsburgh, Pa.
 Erie, Pa.
 Reading, Pa.
 Milwaukee, Wis.

Eastern

Wilmington, Del.
 Baltimore, Md.
 Nashville, Tenn.
 Greenboro, N. C.
 Roanoke, Va.
 Charleston, W. Va.
 Bluefield, W. Va.

Southeastern

Tampa, Fla.
 Atlanta, Ga.
 Augusta, Ga.

North Central

Pueblo, Colo.
 Minneapolis, Minn.
 Omaha, Nebr.
 Lincoln, Nebr.
 Duluth, Minn.

South Central

Dallas, Tex.
 Houston, Tex.
 Fort Worth, Tex.
 Austin, Tex.

Western

Pasadena, Calif.
 Sacramento, Calif.
 Salt Lake City, Utah
 Tacoma, Wash.

percentage of the urban population fall below this same figure and then to only a slight degree. While one might desire a more representative sample, in many ways the material at hand is well worth study since it is reasonably uniform and covers a critical period in our economic history.

The gross expenditures for public health services through official agen-

cies in the cities in these 6 geographic subdivisions for each year from 1930 through 1934, as well as the per capita expenditures are set forth in Table II. Here is indicated a rather interesting trend of expenditures for public health purposes. The average per capita rises appreciably for cities in the eastern, northeastern, and western divisions from 1930 to 1931 with a sharp decline in

TABLE I

NUMBER AND POPULATION OF CITIES 20,000 AND OVER, NUMBER AND POPULATION OF CITIES REPRESENTED, AND PERCENTAGE REPRESENTATION

Geographic Section	Total Number of Cities	Number of Cities Reporting	Total Population 20,000 and Over	Population Represented	Percentage Representation	
					Population	Cities
Northeastern	283	29	34,174,046	7,599,405	22.2	10
Eastern	42	7	3,666,807	1,267,879	34.6	17
Southeastern	28	3	1,778,585	431,869	24.3	11
North Central	39	5	4,113,680	905,854	22.0	13
South Central	36	4	2,787,578	769,394	27.6	11
Western	40	5	4,621,543	446,616	9.7	13
Total	468	53	51,142,239	11,421,017	22.3	11

the two succeeding years, particularly in the eastern and northeastern districts, and some indication of reviving in 1934. The point of sharp decline was a year earlier in the north central district, and the western district shows a marked early rise but gradual shrinking during the last 2 years. The average experience for the 53 cities represented using 1930 as the base year shows a 4.0 per cent rise in per capita expenditure from 1930 to 1931 and a 17.6 per cent drop using the same base to the low in 1933 and a recovery of 3.5 per cent in 1934. In considering these expenditures it needs to be borne in mind that the expenditures for the year 1930 were based on appropriations and budgets made in 1929 and that there usually is a lag of 1 year or more between expenditure trends and the local economic factors affecting them.

It is interesting to compare this general trend of public health expenditures with the criterion numbers showing the changes in the cost of living in the United States from 1922 to 1934, inclusive. This is used as the best available index of general economic conditions. Figure II shows the trend of living costs over these years as compared with the trend of health expenditures. It appears that these have been subject to the same influence. There was some delay in the effect of the depression upon the public health expenditures and a corresponding lag in recovery.

Because these figures were not available by districts, we may turn to the number of bank failures in these sections as indicating the incidence of economic shock which would affect financial stability and public appropriations. Table III, showing the bank

TABLE II

PUBLIC HEALTH EXPENDITURES AND PER CAPITA EXPENDITURES
BY GEOGRAPHIC SUBDIVISION, 1930-1934

Geographic Section	Per Capita Expenditures (Cents)					Total Expenditures (Dollars)				
	1930	1931	1932	1933	1934	1930	1931	1932	1933	1934
Northeastern	97.3	103.4	91.1	80.7	84.2	7,392,520	7,859,044	6,923,508	6,129,298	6,399,832
Eastern	80.5	84.9	70.9	62.9	63.1	1,020,589	1,075,907	899,064	797,773	799,797
Southeastern	93.5	93.9	86.6	81.0	87.8	403,603	405,371	373,847	349,890	379,039
North Central	88.7	52.3	56.4	51.9	53.9	622,737	473,491	510,914	470,012	488,069
South Central	74.4	72.3	57.8	52.6	60.4	572,779	556,125	444,394	404,807	464,876
Western	66.0	75.7	78.1	73.9	71.2	294,206	338,063	348,997	330,038	317,993
Total	90.2	93.8	83.2	74.3	77.5	10,306,434	10,708,001	9,500,724	8,481,818	8,849,606

Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal, and capital expenditures and deficits.

Includes Board of Education expenditures, but not expenditures for physical education and health instruction by teachers.

TABLE III

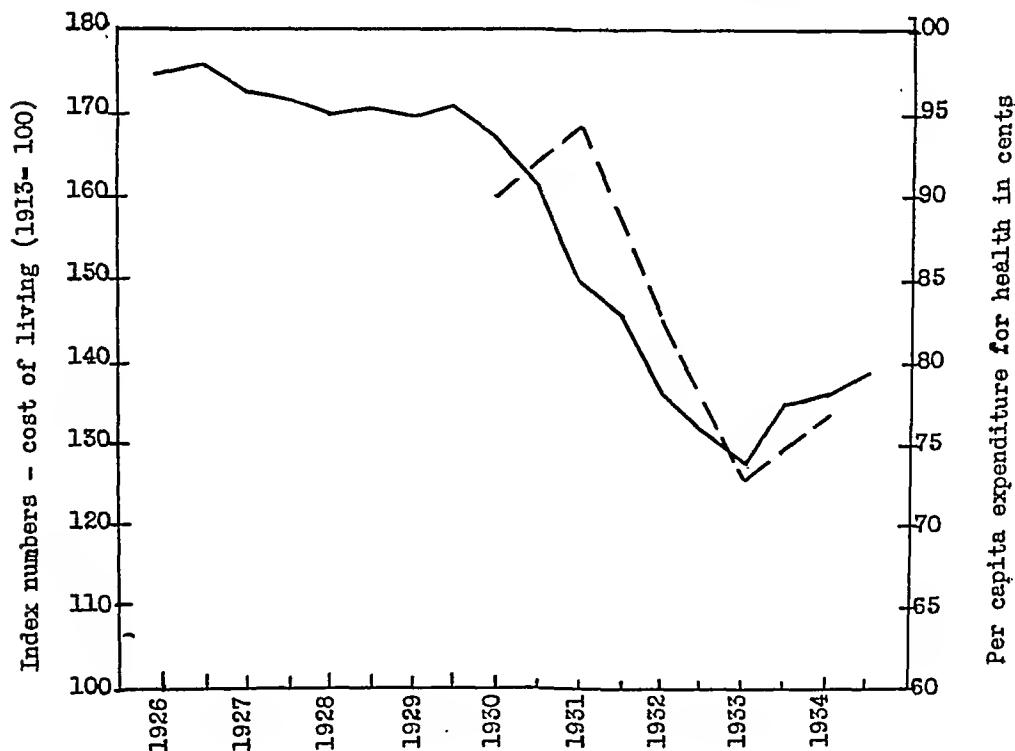
BANK CLOSURES BY GEOGRAPHIC
SUBDIVISIONS, 1928-1932

	1928	1929	1930	1931	1932
Northeastern	66	95	325	874	528
Eastern	33	57	185	235	121
Southeastern	90	138	190	178	84
North Central	256	309	431	752	480
South Central	44	44	200	175	95
Western	10	16	21	80	148
Total	499	659	1,352	2,294	1,456

closures by geographic districts, indicates that the financial shock had already registered itself in the north central district in 1928 which is the same district that showed the greatest drop in expenditures in 1931. It may be significant that the western district showed few bank suspensions until 1931 and increased its appropriations up to 1933. We may expect here at least a year's lag between bank failures and their effect upon the budget.

There has been little discussion of variation of per capita expenditures by geographic districts. The highest average per capita expenditures for cities during the period under study as shown in Table II is in the northeastern district, followed by the southeastern district where the fact that only 3 cities are reporting may account for the high level indicated. The north central district, while having third highest per capita expenditure in 1930, dropped to the last place in 1934 and has the lowest average for the 5 year period. There is little evidence in these figures that the total expenditures are related to public health problems or local interest. They probably reflect more nearly the economic condition of the areas and the availability of resources, though the public concept of an adequate health program no doubt plays a part.

FIGURE II

COST OF LIVING INDEX NUMBERS, 1926-1934, AND
PER CAPITA EXPENDITURES FOR HEALTH, 1930-1934

One would naturally turn to the distribution of expenditures by the several public health functions and also by geographic subdivision, for further information as to the variation of program which would be reflected in higher or lower total expenditures. For this purpose, the expenditures for the last 2 years, 1933 and 1934, were averaged and expressed as percentage of the total budget devoted to each phase of the program. The inability of certain cities to distribute their public health nursing costs to the various services covered, and the fact that certain cities have reported a high percentage of their ex-

penditures as unallocated, makes such a comparison of doubtful value. If this information were reported on the standardized form according to uniform definitions as accurately as are causes of death—poor as they are—we would have a far more interesting and useful picture of public health administration the country over than is possible at present.

Table IV arranges the information for 1934 by size of city and appends it to material previously reported for the years since 1930. This confirms the geographic analysis which indicates a slight recovery in the per capita ex-

TABLE IV
A COMPARISON OF TOTAL AND PER CAPITA EXPENDITURES FOR HEALTH SERVICES *
BY OFFICIAL AGENCIES † FOR THE YEARS 1930, 1931, 1932, 1933, 1934

Group	Year	Number of Cities Reporting	Population Represented	Total Expenditures	Average Per Capita Expenditure (In Cents)	Maximum Per Capita Expenditure (In Cents)	Minimum Per Capita Expenditure (In Cents)
I—500,000 and over	1930	9	8,681,122	\$7,304,295.38	84.1	117.1	41.5
	1931	8	10,173,557	9,767,642.27	96.0	125.2	61.0
	1932	9	10,552,687	9,183,987.15	87.0	100.5	41.3
	1933	9	10,710,253	7,576,869.34	70.7	118.0	36.3
	1934	6	5,273,807	4,083,033.67	77.4	115.0	34.4
II—250,000 to 500,000	1930	16	5,514,738	4,460,489.80	80.9	180.2	53.0
	1931	18	6,106,546	4,958,926.61	81.2	183.3	40.6
	1932 ‡	15	5,123,035	4,038,422.40	78.8	170.7	39.4
	1933	12	4,046,490	2,962,972.45	73.2	169.8	37.7
	1934	8	2,583,389	2,134,408.87	82.6	169.4	36.1
III—100,000 to 250,000	1930	26	3,687,963	2,808,576.22	76.2	170.4	55.3
	1931	26	3,614,393	3,068,661.15	84.9	176.2	36.2
	1932	20	2,905,684	2,293,105.03	78.9	151.5	38.0
	1933	18	2,523,295	1,692,747.90	75.0	158.4	21.1
	1934	23	3,159,202	2,370,995.30	75.1	171.1	25.3
IV—50,000 to 100,000	1930	28	1,842,596	1,499,542.31	81.4	147.6	27.8
	1931	29	1,905,001	1,550,728.78	81.4	143.6	25.4
	1932	20	1,296,450	1,014,720.30	78.3	188.8	19.9
	1933	15	1,025,118	816,851.36	79.7	144.7	35.2
	1934	22	1,504,453	1,125,488.35	74.8	145.9	27.7
V—20,000 to 50,000	1930	40	1,210,047	1,078,761.06	89.2	226.5	21.1
	1931	42	1,251,563	1,016,134.45	81.2	216.3	26.1
	1932	24	721,758	479,392.10	66.4	172.8	26.1
	1933	17	539,539	424,441.69	78.7	166.5	21.7
	1934	16	545,421	424,399.55	77.8	170.7	21.0
VI—Under 20,000	1930	53	572,737	436,453.16	76.2	181.6	10.1
	1931	50	553,001	423,899.67	76.7	199.8	10.1
	1932	26	262,357	216,196.47	82.4	186.9	10.1
	1933	19	233,064	157,052.87	67.4	189.6	23.4
	1934	15	179,564	143,985.57	80.2	175.6	27.6

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal and capital expenditures and deficits.

† Includes Board of Education expenditures, but not expenditures for physical education and health instruction by teachers.

‡ In Table I (*A.J.P.H.*, March, 1935, p. 350), there appeared an error which is here corrected.

penditure in all sizes of cities except those from 20,000 to 100,000. Even in this group, the cities from 20,000 to 50,000 show an upturn from the year 1932. In the 50,000 to 100,000 group, however, the 1934 expenditure was lower than any of the preceding 4 years.

Obviously here too an accurate analysis by functions would help our understanding. It has frequently been pointed out that the use of the per capita expenditure as an index of the relative adequacy of the public health program or the comparison of different areas is subject to misunderstanding unless extreme care is exercised in the selection of items to be included as common public health expenditures. While it is believed that such care has been reasonably well exercised so far as the total expenditures are concerned in the material here reported, it is apparent that no breakdown of the material into major classes of expenditures is as yet possible. It is gratifying that

even 53 cities have been willing to coöperate through the Contest in reporting their expenditures in some detail and it would seem likely that the time has come when elementary classifications of expenditures could be set up with suitable definitions and a beginning made in the reporting of the cost of health work according to the elements of the program.

The Sub-committee on Current Health Department Practices is attempting to present the status of American health department practice as it is reflected by appropriations and personnel. It is hoped that through these series of analyses interest may be stimulated in better and more regular reporting of these elemental facts. Much still remains to be done in the way of development of definitions of services and method of recording before extensive use can be made of the valuable data which might easily be made available annually.

EDITORIAL SECTION

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ANTIRABIES TREATMENT

THERE is before us¹ now the *Fifth Analytical Review of Reports from Pasteur Institutes on the Results of Antirabies Treatment*. The author, Lieut.-Col. McKendrick, is the master at this type of work. Practically every type of vaccine is considered, grouped as killed, live, heated, and other. For the general reader, the conclusions are the most valuable, while for those connected with institutions a study of the entire article is indicated. The cases considered cover chiefly those reported in 1932, and reports which reach the offices at Geneva later than May 31, 1934, will not be dealt with until the next review. While therefore the report is a little late, as far as the actual cases go, it is most valuable and informing.

Of a total of 115,859, among whom 439 died of rabies, the percentage mortality was 0.38, as compared with 0.49 in the first review, 0.48 in the second, 0.23 in the third, 0.48 in the fourth, and 0.41 over the whole period covered by the 5 reviews. These are the results, irrespective of race, method used, and other modifying factors. The review itself goes into the animal involved, the evidence of rabies in such animals, the severity and location of the injury, the protection of the bite by clothing, date of the commencement of treatment, and of other factors which might influence the results.

An interesting item is that concerning treatment paralysis. Apparently this is higher in those bitten by wolves than by any other animal, and in deep bites such as are apt to be inflicted by wolves. Those having suffered wounds of the head develop treatment paralysis more than 6 times as often as those with bites on the arm, trunk, or leg. There is not a very marked difference observed in connection with the delay in commencing treatment, though after a delay of 14 days, cases of paralysis develop somewhat more often. Paralysis followed treatment with dilutions of the cord more often than from any other preparation, and less frequently from phenol killed vaccine than other forms. From a study of

406,196 persons, the conclusion is reached that paralysis occurs after treatment with live vaccines 4 times more often than among those treated with killed vaccines, and 11 times as often as among those treated by heated vaccines.

There is a special section in the report on antirabies treatment in the Soviet Republics, 1927-1932, but the figures relate to the treatments given in 1931 and 1932. On account of delay in receiving the reports and certain other reasons, no division has been made which considers the animal, the nature of the bite, etc., so that the results apply to all types of cases. From 1927 to 1932 inclusive 310,109 persons have been treated and the mortality for successive years has been 0.23, 0.20, 0.15, 0.11, 0.14, and 0.13, showing that the rate fell rapidly from 1927 to 1929, but since that time has remained fairly constant. The numbers of those bitten by wolves were respectively 406, 153, 82, 104, 126, and 66, the deaths being respectively 35, 20, 3, 6, 6, and 7, with the mortality rates 8.6, 13.1, 3.7, 5.8, 4.8, and 10.6. It is evident that there has been a significant decline in the number of persons bitten by wolves and this has led to a fall in the general mortality, which among those bitten by dogs were respectively 0.21, 0.21, 0.17, 0.10, 0.13, and 0.1. However, the author points out that the marked decrease in the number and proportion of persons bitten by wolves is not in itself sufficient to account for the drop in general mortality.

Only 1 case of treatment paralysis is reported for the period 1931-1932, and the method of treatment in that case is not stated. Before that time the treatment paralyzes reported during the successive years mentioned were 20 in 1927, 17 in 1928, 12 in 1929, and 5 in 1930.

The results of this exhaustive study are entirely reassuring. There has been a general fall in mortality and an improvement in cases treated. Since 1930, no significant differences between the methods of treatment have been detected, though in 1927 the original Pasteur method gave results distinctly inferior to those obtained by the Högyes-Philipps method. In general it may be said that the Högyes-Philipps method gives the best results, with the Fermi, Pasteur, and Remlinger methods following in order, but the differences are now no longer significant. The whole report confirms the value of Pasteur treatment and should inspire us all with confidence in the method and with a desire to see that it is carried out in all persons bitten by animals suspected of having rabies.

REFERENCE

1. *Quart. Bull., Health Organisation of the League of Nations*, III, 4:613-653 (Dec.), 1934.

INDUSTRIAL HEALTH — AN EXPENSIVE NEGLECT

IN the recent review of selected books of interest to public health workers¹ one is impressed with the spurt in new works devoted to industrial health. Has the depression given industrial hygienists more time to turn to the pen? Have new hazards or new occupational diseases suddenly appeared? With so many out of work, why the increased interest in those who remain on the job?

There is usually a basic reason for every surge in human affairs. It is also invariably economic, and, one does not have far to look to find it in the subject under discussion.

Death rates have been dropping all along the line (despite the depression), and in all age groups. However, the least noticeable change has been in the industrial population and particularly in the employed themselves, as evidenced by longevity studies, tuberculosis studies, pneumonia statistics and the rates for

so-called degenerative diseases in general. This great class of the population has not shared the recompenses of the period.

To one conversant with the situation 25 years ago, it looked as though selling the idea of industrial hygiene would be a "cinch" in America. There was European experience, particularly English, as a precedent. Big business economics alone would put it across. Insurance companies would naturally be interested (and two or three have been). Hanson in the Massachusetts Health Department, and Graham-Rogers in the New York Labor Department were speaking for leading states. Kober had published a volume under President Theodore Roosevelt's Homes' Commission. Labor organizations, of course, were primarily interested, and Hoffman was writing whole bulletins for the U. S. Department of Labor. And, as for the public, it was a protective and humanitarian necessity. It seemed that 5 to 10 years, with the collateral thrust given by the newly-created safety-first movement, would turn the trick.

There are important exceptions, of course, to any generalization, but a 25 year retrospect of industrial health in the United States really shows very little actual accomplishment, whether measured in terms of healthier conditions of work, less illness, lessened occupational disease, or lengthening of life among the industrially employed.

True, during this period much progress has been made in discoveries in this field and much has been written, but far, far too little has ever been applied. Deaf ears have largely been the recipients.

Thus, the repeated warnings against the exposure of workers to breathing mineral dusts went practically unheeded until now there is scarcely a state in the Union in which suits are not pending for the most characteristic of all occupational diseases, "silicosis"—a total in damage claims, according to some informed persons, of over 100 million dollars. It is also no defense of employers or managements to claim they were not informed of this danger since state laws recognized it back as far as the 90's with the requirements for blowers systems and proper ventilation.

It seems the cart has always been before the horse in industrial hygiene in this country, so that the deleterious effects of new methods or new substances have been first discovered in the workers themselves (as the guinea pigs) and before scientific investigations were undertaken—usually as the result of some catastrophe.

It is probably not going far astray to say that much of the lack of progress in this field has been due to political maneuvers which have cleverly diverted funds, ostensibly meant for industrial health supervision, to lay channels, and to the employment of unqualified personnel in place of *trained health workers*, not only physicians, but specialists in all fields having something to contribute to public health.

The remedy, we think, lies in better political leadership; one which can see the opportunity to do a great service to a vast part of the population; one which will capitalize, if we may put it that way, upon the idea of a higher regard for workers' lives and continued well-being; in short, one which will really motivate hygienic principles for all who work.

The problem therefore is much larger than the employer—even the big employer: it must reach the smallest work-place. It is larger than the labor union: it must reach the untrained and indeed the casual laborer. It is larger than the "average" which will "get by," since it demands specialized service.

Finally, the problem is one which demands more of the taxpayer's money in one direction—government supervision; but it will ask a whole lot less in another—the costs of neglect and dependency.

Thus, the books of the day are truly a response to the demands of the times, and a casual examination of those referred to will show nearly all are the product of matured minds and vast experiences which are speaking for human betterment.

REFERENCE

1. *A.J.P.H.* 25, 4:499-504 (Apr.), 1935.

THE BULLETIN OF HYGIENE

IN 1926, the *Bulletin of Hygiene*, a journal of abstracts, appeared, and it is not too much to say that for teachers, students, and practical health workers it has been a god-send. The auspices under which it is issued and the list of abstracters and commentators stamped it at once as authoritative. It has maintained the standards set by the first issue and one would hardly know how to get along without it now.

The history of the establishment of the *Bulletin* is interesting. The Bureau of Hygiene and Tropical Diseases, known at that time as the Sleeping Sickness Bureau, more than 25 years ago began to abstract all literature on sleeping sickness, which at that time was threatening the extermination of the populations of whole areas in tropical East Africa. The need for a central organization in London to maintain liaison between the medical officers in Africa and the investigators studying the disease at home and abroad was evident, so in 1908, the Sleeping Sickness Bureau was established. Its object was to collect all available information regarding the disease, to collate, condense, and translate this information, and to distribute it as widely and quickly as possible among those engaged in combating the disease. The first number of the *Sleeping Sickness Bulletin* appeared in October, 1908, and was followed by 39 numbers.

It became apparent that this Bureau might profitably be enlarged and its scope widened; so in 1912, the *Tropical Diseases Bulletin*, which took the place of the *Sleeping Sickness Bulletin*, was begun. It is now in its 32nd volume, and still being issued. Beginning in 1914, this Bulletin issued special Sanitation Numbers, and later Sanitation Supplements, designed especially to deal with preventive medicine in the tropics. This continued until 1926, when the Sanitation Supplements were expanded into the present *Bulletin of Hygiene*.

We wish for the *Bulletin of Hygiene* a wider circulation. While issued particularly for the benefit of British medical officers overseas, it is filled with abstracts collected from sources over practically the whole world, so that the information it contains is not local, but valuable to all workers and students in public health. The abstracts are signed, and often the abstracter comments on the high points, shortcomings, and conclusions of the articles under consideration. There are also quite frequently articles which are judicial analyses of extensive literature on big subjects which are of importance to all nations. These too are signed.

There are ten main sections which cover in order: (1) Conventions, Laws and Sanitary Regulations; (2) Public Health Administration and Social Services;

(3) Industrial Hygiene; (4) Vital Statistics and Epidemiology; (5) and (6) Port, Ship and Aviation Hygiene; (7) Food and Nutrition; (8) Bacteriology and Immunity; (9) Miscellaneous; and (10) Review of Books. We know of no other abstracts which cover as much ground and cover it as thoroughly and intelligently as do these. A feature which may be mentioned is the practical reference to volume and page of earlier numbers where earlier work is described, a great aid to the student. We wish that the book review section could be enlarged. Like the abstracts and comments, they are usually of a superior character.

It may be said frankly to our readers that the establishment of an abstract journal comparable to this has for some years been the earnest hope of some of those responsible for the *American Journal of Public Health*. So far we have not been able to interest anyone sufficiently to finance such an undertaking. We have several excellent abstract journals in this country devoted to certain specialties, but nothing which covers the ground of public health. The American Public Health Association is the body which should sponsor and direct such an undertaking. In England, the Bureau of Hygiene and Tropical Diseases, which is responsible for the *Bulletin of Hygiene*, is financed by 42 Governments, Dominions, Colonies or Protectorates. In this country our Public Health Service issues the *Public Health Reports*, but this, valuable as it is, is in no sense an abstract journal which covers the whole field of public health. Perhaps our federal government will in time realize the importance; as the English Government has done, of such a publication, or possibly some farsighted philanthropist will endow such work. Let us hope for the best, and work toward this end.

A NEW JOURNAL

IN September, 1934, there was founded the *Journal of the New Zealand Branch of the Royal Sanitary Institute*, which is to be published every alternate month. The New Zealand Branch of the Institute was formed in an endeavor to carry out in that Dominion the traditions and objects of the parent society in England, and the *Journal* has been founded to provide a means toward that end. New Zealand has many problems in field work and administration which are peculiarly its own which cannot be filled by any journal except one published on the spot by those familiar with such problems.

The first two issues are filled with interesting material of the highest order. The format is in general closely like that of the journal of the parent institute, with its seal on the front cover. We wish the new *Journal* much success, and are glad to announce that an exchange has been arranged between the *American Journal of Public Health* and our new contemporary.

THE OPEN FORUM

REGINALD M. ATWATER, M.D.

Executive Secretary, American Public Health Association

KEEPING THE RECORDS

MANY a health officer and many another administrator in the health field will thank heaven for the new volume *Recording of Local Health Work* by Dr. W. F. Walker and Carolina R. Randolph. This large book, which is published at \$2.00 through the generosity of the Commonwealth Fund, is one which promises to be of far reaching usefulness, and it may well point the way toward a desirable degree of standardization. That which the Committee on Administrative Practice has accomplished since 1920 in the general field of public health administration still remains to be done in the field of records. This is not an attempt at a review of the volume, which deserves much more adequate notice elsewhere, but is written with a desire to express appreciation for this needed compilation of practical record forms and to commend it to all field workers who have responsibility for keeping records. "It is both necessary and possible to make case records and individual service records valuable tools for the use of the local health department staff."

THE CONTESTS

FROM the viewpoint of the Central Office it has been interesting to watch the Health Conservation Contests work through to the awards for 1934 which were announced in the May, 1935, *Journal*. It is an impressive sight to see what a strong stimulus these Contests provide to health departments in cities and full-time county districts. The exhibits sent in by many of the contestants leave no room for doubt of the persistent effort that has been made to improve basic health services.

The work of the Contest Committees shows how carefully the records of the field directors are utilized in grading the contestants. The awards were finally made only after a personal check of each winning department had been made by Dr. Buck or Dr. Wallace.

Interesting too has been the use made locally of the contest for publicity purposes, and it is very certain that health department appeals for appropriations have been strengthened through these contests. Many sponsoring committees from the Chambers of Commerce have been utilizing the *Appraisal Forms* to point out weak spots, and for guidance in giving the programs proper balance. What a change has come in this country in administrative practice in the last 15 years! Yet some health officers and bureau heads are still working along in the old rut, just as though there never was an *Appraisal Form*, or a "Community Health Organization," or a record of performance elsewhere.

NATIONAL PLANNING FOR HEALTH

I AM sure that the membership will note with approval the fact that a survey of the National Health Council and its member agencies has been recently completed by Professor Hiscock of Yale. These 17 organizations in the health field are affiliated under a Council to which the American Public Health Association sends two representatives. Beginning back as far as 1921, this National Health Council has served as a clearing house for the voluntary health agencies, both the professional societies like ours and the "operating organizations." The Council has provided common services such as a library, shipping and bookkeeping

work, multigraphing service, joint office leasing, etc. With the thought that there should be more unified planning among these member agencies, this report has been prepared and there appear to be encouraging prospects. Eugene L. Bishop, M.D., President, American Public Health Association, and John L. Rice, M.D., Clarence L. Scamman, M.D., John A. Ferrell, M.D., and Louis I. Dublin, Ph.D., of the Executive Board, recently met with other representatives of Council agencies under the Chairmanship of Colonel Theodore Roosevelt, President of the National Health Council. The report by Professor Hiscock was approved in principle and referred to a Continuation Committee on which Dr. Ferrell will represent the Executive Board. The splendid possibilities for coöperative long-range planning are sufficient to make this development worthy of full support by the American Public Health Association.

PREVENTING DIPHTHERIA

HAVE you checked over the recommended procedures for diphtheria immunization as published in the *June Journal*? Are your procedures in line with these tested routines? One health officer describes the report as giving him vastly more confidence in his program of diphtheria prevention which otherwise he regards as something of a "shot in the dark."

NEW MEMBERS

MOST encouraging has been the splendid response by some state and large city health officers to the suggestion made by Dr. Parran of New York that such departments advocate the advantages of membership in the American Public Health Association through their staffs and to associated health workers. Through his own department Dr. Parran and his staff last year secured 51 new members, and this

year 47 new applications have been received from New York. Not infrequently prospective members have been found simply waiting to be asked, as though membership were open only on invitation. The advantages of association membership are evidently apparent to individuals as well as to local health departments. This office will be happy to supply application blanks, lists of present members by locality, etc., on request. Have you noted the long list of new applicants in the *June Journal*?

MEASLES CHART

I AM pleased to note that the graphic story of the usual course of measles published in this column in the May issue has proved useful to a considerable number of persons in the field. Several requests are at hand for permission to use the same line cut for reproduction. This cut will be supplied gladly in order of request.

INSTITUTE FOR HEALTH OFFICERS

APPROVAL has been expressed of the idea of an Institute for Health Officers to be held at some future Annual Meeting. What do you think?

EPIGRAMS

IT is also gratifying to note the response to the suggestion that we carry useful health epigrams and aphorisms. Several members have accumulated these for years and have enriched printed programs, annual reports, pamphlets, etc., by this means. Acknowledgment is made of those sent in, especially for the reference to the excellent compilation by Dr. James A. Tobey in the *American Journal of Public Health* for 1920, page 649. I had forgotten this list and we will add others from time to time which cannot be found in Dr. Tobey's collection.

"Health and Cheerfulness mutually beget each other"—Addison, *The Spectator*.

PUBLIC HEALTH EDUCATION*

What Have You?—What showing of child or adult health education, or of training in either direction, will you have for display at Milwaukee in October?

Scrapbooks, binders, three-dimension material, movies, slides, film slides, a play, puppets or other demonstration? Please write to the editor of this department.

Health Motion Pictures—Several 16mm motion pictures have been reported. We hope to show these and others at Education and Publicity Headquarters, Annual Meeting of A.P.H.A. at Milwaukee in October.

Who knows of other pictures produced by departments or associations?

Iowa Is No Ostrich—Newspaper and radio stations in Iowa, some of them at least, are not hiding in the sand of silence, refusing to mention syphilis or venereal diseases.

In the May, 1935, *Journal*, page 644, we put this question, "Do They Mention Syphilis?" Dr. Joseph H. Kinnaman, director, Division of Child Health and Health Education, State Department of Health, Des Moines, reports that

. . . radio stations WSUI at Iowa City, Iowa, and WOI at Ames, Iowa, permit the department and the Iowa State Medical Society to discuss the problem of venereal disease control and prevention. Both of these stations are integral parts of the two large tax supported state universities.

Dr. Kinnaman sends clippings from Sunday feature articles.

Under "Heart Disease" in *Des Moines Register*, Dec. 16, 1934:

The list of important types of heart disease includes: . . . (5) syphilitic heart disease. Syphilitic heart-vessel disease is about four times as common in men as in women. The average incidence in the United States is said to be about 10 per cent. This disease may affect the aorta (the great artery carrying blood from the left ventricle of the heart), or the coronary vessels. The prevention of syphilis, its early diagnosis and its proper treatment at the onset should greatly reduce cardiovascular syphilis.

"Getting at Germs," in the same paper, March 24, 1935:

The expert can quickly and accurately say whether or not the inflammation of the eye is caused by the organism causing gonorrhea, by other bacteria, or is not due to a germ infection. The prompt use of the direct smear followed by adequate treatment as indicated have prevented gonorrheal ophthalmia from terminating in blindness in a good many instances.

"Defenses against Disease," same newspaper, April 14, 1935:

Other preventable diseases reported to this department in 1933 include malaria, ophthalmia neonatorum (gonorrhea of the eyes of the new-born) and pellagra.

An editorial in the *Mt. Pleasant News* discusses

. . . an editorial in the *Chicago Tribune* (which) stresses the menace to society of that terrible social disease, Syphilis. Prudery can no longer keep warnings silent.

We have clippings from 7 Iowa newspapers which published the following release from the State Department of Health, entitled "The Laboratory in Disease Prevention":

Among the various tests carried out daily in public health and other laboratories, none is more remarkable than the Wassermann test. This is a serum test applied to a small amount

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

of blood taken from a person or patient. In order to perform the test, other materials in definite amounts, such as guinea pig serum, rabbit serum and sheep blood are placed in small test tubes containing the specimen of human serum. When the test is completed, liquid in the test tubes is either of a clear red or cloudy color. In general, if the color is a clear red the test shows that the patient concerned is free from blood disease. On the other hand, if the tubes show a cloudy color, this indicates the presence of blood disease. The results of the Wassermann test, a well known test for syphilis, are clear-cut, striking, and trustworthy.

The Wassermann test is of value in the early recognition of syphilis. This disease not infrequently is acquired in innocent manner. Blood tests, performed routinely on a group of over 500 expectant mothers in a certain hospital, showed that 10, or 2 per cent, were infected. Adequate treatment was of untold benefit in this group, (1) in relation to maternal health, and (2) in making possible the birth of infants free from congenital disease.

The great value of the Wassermann and similar tests in disease prevention, is apparent. Without such laboratory work, disease in infants and older persons continues unrecognized and unchecked. Children who suffer from the innocent or congenital form of syphilis, bring sorrow to the home and burden to the state. Many of the mental cases in our state institutions are there through neglect on the part of society to provide for early recognition of disease. Laboratory tests, more readily available for all, represent true economy as well as a major factor in disease prevention.

"Distinctive Interpretation in 1934-1935"—Under this heading are announced the annual awards of the Social Work Publicity Council.

A committee selected from material which came to its attention 10 items which were deemed worthy of special citations. Among these were 3 from the field of public health, which was represented on the Awards Committee by Paul Komora, National Committee for Mental Hygiene.

The paragraphs which follow are from the *News Bulletin, S.W.P.C.*, 130 E. 22d St., New York, N. Y. May, 1935. 25 cents.

The Health Hunters: a series of radio

sketches for health education broadcast by the New York State Department of Health.

This is a year-round program of weekly broadcasts, in which various health subjects are colloquially and simply dramatized, to show how these subjects are woven into the everyday life of the community.

These programs are first broadcast from Station WGY, but, after the original broadcast, electrical transcriptions for reproduction are available not only to other broadcasting stations in the state, but also for use at conventions or health demonstration meetings, wherever the size or importance of the group warrants.

The sketches in this series are all set in the imaginary town of Utopia, and several characters appear again and again, giving it a good week-to-week continuity. The characters are well drawn, and the dialogue is written with naturalness. There is humor, too, and this is not a sugar-coating, but grows out of the subject matter and the characterization.

Subject Matter: A list of the subject matter shows that the broadcasts cover not only the conventional matters usually discussed in health education but seasonal matters that lie even closer to the conscious interests of communities. It is the way this subject matter is tied up to ordinary people in their everyday life that is distinctive in these broadcasts. For a Washington's Birthday broadcast: "Dr. Jones prescribes for General Washington," Dr. Jones being the character in the series which ties them all together. This sketch shows health practices and treatments in Washington's day and later developments. The sketches on mental hygiene are founded on village gossip of a type familiar to everyone, and, therefore, put these baffling problems into language easily understood. A new kind of spelling bee introduces public health terms and information.

Time: The programs are 15 minutes long. The sketch takes about 12 minutes and the rest of the time is divided between excellent interpretative introductory and concluding comment—allowing time, of course, for station announcements.

Response: The number of letters which come in as a result of the broadcasts varies, of course, depending on whether literature is offered, and on the subject matter and general appeal. The two broadcasts which brought the largest number of inquiries were Episode 70, "Bess Tries an Experiment" (235 responses), in which the women of

Utopia try living on a food budget for a week with low cost planning; and Episode 72, "A Tragedy in Utopia" (387 responses), which shows the needless death of a young woman due to venereal disease, and which points out how a lack of knowledge and the feeling that such matters should not be discussed cause untold misery. About this last program—the cause of the death was conveyed by intimation, but words "venereal disease" were used in the concluding comment, without bringing a single protest from the radio audience. (This is rather significant in view of the squeamishness of some of the networks in relation to this subject.)

The *Mother's Day Campaign for 1934*, conducted by the Maternity Center Association, New York:

One of the intriguing things about the Maternity Center campaign is the way it has ingeniously converted an event born of a beautiful but easily cheapened and artificialized sentiment into a mechanism for the achievement of a high social purpose, namely, the saving of mothers' lives. Thanks to the Maternity Center Association, under the leadership of Hazel Corbin, the Mother's Day idea has been vitalized, enriched, and rightfully enlisted in a practical and much needed health activity.

A great deal might be said of the merits and virtues and publicity values inherent in this educational project, so admirable in its conception, planning, and execution, for which credit should go to Dwight Anderson. He originated the idea and acted as consultant for the five campaigns. The directions and "specifications" are concise, practical, and complete; and the objectives presented not beyond the reach of reasonable local effort and achievement. Step by step, it builds up a simple, clear, uncomplicated design, easy to follow in even the most backward and underprivileged, not to say average, American community.

Its use of the "survey of maternity facilities" device as a preparatory basis for community action was a master stroke. It not only furnishes a pattern of action, but also the weapons and ammunition. A well stocked "publicity kit" puts at the disposal of community leaders an armory of facts and arguments drawn from comprehensive national and local surveys and studies rich in pertinent and valuable source material. It all but conducts the local campaign.

The suggested newspaper and magazine stories, conference programs, radio talks, sermons, and other forms of publicity "copy"

are all excellently prepared and "served up"—interesting, readable, and in simple diction throughout. Withal they are substantial and solid in educational content, suitable for all levels of the adult population, authoritative and enlightening, as well as persuasive, convincing, and conducive of action. The plan is sound and workable and the goals proposed are modest and realizable. The whole thing inspires confidence and expectation. It is a splendid example of planned publicity effort worthy of emulation by national agencies in other fields of public health education and interpretation.

The "Nervous Breakdown" — an article in *Fortune*:

A notable contribution to public education in the health field appearing this year is an article, "The 'Nervous Breakdown,'" published in the April, 1935, issue of *Fortune*, anonymous, as is all of the writing in this magazine.

It is an illuminating discussion, comprehensive and comprehensible, of many phases of an abstruse and complex subject—the nature, causes and symptoms of the neuroses, the main types of mental and nervous disorders differentiated according to their medical and social significance, the methods and results of treatment, the various schools of psychological thought, the scientific problems confronting psychiatric research and practice, etc., etc.—that answers many questions and clears away many of the obscurities that surround the subject in the public mind. The fact that this article appeared in *Fortune* increases its importance in that this magazine reaches the influential group of board member type not ordinarily reached by articles designed for public health education.

In the preparation of the article staff members of *Fortune* "studied and researched," and finally consulted a dozen or more men "whose names loom largest in the fields of mental hygiene, psychiatry, and psychoanalysis." Having made "the best synthesis of which it was capable," it sent copies of the manuscript to all authorities whom it had consulted. Then, following its "typical procedure" (typical for *Fortune* but unusual in general editorial practice), it corrected the errors of fact that these authorities pointed out, and where they amended, amplified or dissented, their comments were carried in liberally sprinkled footnotes.

At that, leaders in mental health work tell us that the article contains "some inaccuracies and misinterpretations," but that in the main it is "a noteworthy contribution

to public education in mental hygiene, highly valued for its fair, impartial, and substantially sound presentation of an important subject, and exceedingly helpful in the promotion of our educational aims."

Fortunately the article is to be reprinted in book form by Doubleday, Doran, available June 21, 1935.

Syphilis in Milwaukee—George A. Dundon, director of health education, Milwaukee Health Department, records that local newspapers use "social diseases." Two letters addressed to Hazel I. McCarthy, instructor in social hygiene, of the Department, present the local radio attitudes.

WTMJ, *Milwaukee Journal* station says:

We have read the copy and after giving it some consideration cannot help but feel that material of this nature is of itself so delicate that at present it would be hard to incorporate it in any radio address. Radio, like no other media of reaching the people, goes directly into the home, and unlike the printed page is heard by all who are within its range. While in the case of printed material, only those who desire, read its content. Beyond this there is also the personal side of radio, the actual voice discussing matters, which in this case would be far from a "parlor" subject. While the time may come when these subjects will not be avoided, the writer hardly feels that at present that time has arrived.

Might we suggest that you contact Mr. Theodore Wiprud, Executive Secretary of the Medical Society of Milwaukee County. Mr. Wiprud has for years been broadcasting over this station, discussing various health topics. To the best of my knowledge he has invariably stayed away from topics such as you mention, apparently considering them far too delicate for general treatment on the radio.

It seems also that the person delivering the talk might make a vast difference in the subject matter itself; by this is meant that while some outstanding authority on such a subject might be accepted in a discussion of this, an everyday commentator, or even a man of medicine not so widely known, might be severely criticised.

To sum up this answer to your letter we frankly believe that treatment of subjects of this type opens up the way to considerable discussion and that through discussion with

health authorities, etc., some means might very readily be adopted for the broadcasting of this material in a manner which would offend no one.

WISN, Hearst station says:

Relative to your recent letter regarding my point of view on whether or not a radio station should be permitted to use the word "syphilis" on the air, use of which was restricted according to the letter you sent me from William F. Snow, general director of the American Social Hygiene Association, please note:

This station has had no occasion to pass censorship upon the use of this word in any form—but I would suggest that it would be more proper to use the phrase "a social disease" instead of the word "syphilis" due to the fact that a radio station has as its audience many children of tender years, and the use of the latter word might cause considerable embarrassment to certain parents because of their inability to explain to the children if questioned. Adults would have a perfect understanding of the phrase "social disease"—while my experience with children has shown that the use of the words "social disease" causes no question in their young minds.

New Mexico Is Not Afraid—From J. Rosslyn Earp, director, New Mexico Bureau of Public Health, comes this statement:

Our New Mexico newspapers print "syphilis" either in headline or text without any hesitation. My articles on syphilis are printed just as widely as any of the others. The most popular article (judged by fan mail) that I have written was one on gonorrhea. Radio stations are equally liberal.

Unmasking "Social Diseases"—The returns, reported this month, reveal attitudes and practices in newspaper offices and radio stations in the use of "syphilis," "venereal diseases," etc.

Further reports are requested.

What About Rural Work?—In preparation for the Public Health Education Institute in October this department would like to chronicle routine

plans and practices as well as the unusual projects and materials used in smaller cities and the open country.

Who will be the first?

What To Do in Health Education
—In "An Organized Community Health Program," Savel Zimand, follows his statement of objectives with a concise review of methods. Reporting on the basis of work done in a New York City district, what follows seems to have fairly general application.

Broadly speaking, it may be said that there are three channels for public health education:

a. *Personal instruction* of individuals through the health department's staff and other professional groups such as physicians, public health and clinic nurses, and social workers and teachers, who come in direct contact with the public and are in a position to give personal advice on health matters.

b. *Small group contacts* through such community organizations as churches; Sunday and evening schools; parent-teacher associations; settlement classes; men's, women's, boys', and girls' clubs and Boy and Girl Scouts.

c. *General propaganda* by means of printed matter, public meetings, radio talks, exhibits, et cetera.

While one hesitates to give numerical values, I feel that the most valuable health education can be and is that offered by professional workers and especially private physicians and nurses who know the individuals and their home conditions and are in a position to give personal health advice. Next to this in effectiveness is the health information and knowledge given to small numbers of persons organized in special groups.

But in order to build up an informed public opinion and to secure support and assistance from the community at large, the work of these special agents must necessarily be supplemented by mass educational efforts. For measures of prevention and control of preventable diseases succeed only as rapidly as public opinion is ready to support these measures, and the general health educational activities stimulate and help to prepare public opinion.

A partial list of subjects to be stressed in a general health educational program was given earlier. While many of these subjects, depending of course on the conditions

in the particular neighborhood, should receive emphasis throughout the year, *intensive drives in certain fields* will prove an effective method to force attention and create interest in a special subject. It seems desirable to select the month for a campaign well in advance and, if possible, to arrange a time when other organizations are not planning campaigns which may compete for popular interest. These campaigns can be associated with national efforts, or form part of a community-wide drive, or, on a subject needing special emphasis, can be initiated in and limited to a certain district.

A campaign calendar will naturally vary somewhat from year to year, just as the subjects vary, for certain work can be stressed more effectively during certain seasons of the year. Intensive work on diphtheria immunization seems to yield better results after the winter months, when the epidemic of colds has somewhat abated; the early diagnosis of cases of tuberculosis during April, to correspond with similar efforts by other organizations; child hygiene, nutrition, and dental hygiene during May, to fit in with Child Health Day, or during the summer months; periodic health examinations in June or January; street safety in July and August when schools are closed and the children are more apt to be on the streets; health examinations for children in the latter part of August, and in September, before they enter school.

In *Quarterly*, Milbank Memorial Fund, 40 Wall St., New York, N. Y. Oct., 1934. 25 cents.

Health Education in the Journal, May, 1935—In "Trend in Public Health Nursing," by McIver (page 551), is a paragraph which points to a desired trend in public health education as well:

The most characteristic trend in the present public health nursing movement is the tendency toward a critical self analysis—a desire to evaluate the past and present public health nursing practices and accomplishments in terms of proven value. At no time in the history of public health nursing has there been as much available material as there is at present.

In "Specific Expenditures and Personnel of Official Health Agencies in Certain Cities". (page 545), we find

mention of administration; vital statistics; general sanitation; food, drugs, milk; child supervision; communicable disease; tuberculosis; venereal disease; and laboratory. The discussion is "exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal, and capital expenditures and deficits." Otherwise there is no mention of public health education. Dr. Mountin emphasizes the difficulties encountered.

Definitions of services and fiscal practices of the health departments . . . could not always be reconciled with each other.

In "Recent Studies on Psittacosis," by Meyer, Eddie, and Stevens (page 578), we find this:

Theoretically, psittacosis is a disease which could be easily controlled, provided the public would appreciate the possible danger inherent in contact with birds, particularly those of unknown origin.

"Effectiveness of Radio in Health Education," by Turner, Drenckhahn, and Bates (pages 589-594), offers this conclusion:

The general lack of discrimination as to the reliability or unreliability of broadcast health advice shows the need for controlling health broadcasting and for instruction concerning pernicious advertising.

Here is the closing paragraph from "Public Health Education Technics of Special Experiences—Newspapers," by Higby (pages 605-608):

The copywriter of health information should so identify himself with the intangible personality which is represented by the paper for which he is writing, that when his name appears on the upper left hand corner of the copy, the editor knows he need go no further but in the rush of the day can shoot the story to the copy desk without re-write or slash. In other words, he accepts you as a member of his staff.

"What Is Public Health?" by Hill (page 622), is something we should not miss.

"The 1934 Health Conservation Contests" (pages 633-635) describes

that project of which Dr. A. J. Chesley says:

These health contests provide the most effective means available anywhere for bringing public health problems and the need for their solution forcibly to public attention, particularly locally.

At the July meeting of the Western Branch, A.P.H.A., "modern advances in health education" are to be discussed (page 640).

"The Open Forum," by Atwater (page 642), refers to the Public Health Education Institute and proposes an Institute for Health Officers.

As usual, "Books and Reports" includes background material for those concerned with health education.

"Association News" and "News from the Field" are not likely to be overlooked in view of their interest and value.

Hygeia, June, 1935—The principal articles in *Hygeia* are listed here month by month as a continued reminder of source material on popular health topics. Published at 535 N. Dearborn St., Chicago, Ill. Single copies sent free to teachers and public health workers.

Health superstitions . . . The challenge of medicine (the spirit of a profession) . . . A doctor looks at his patients . . . A man's best friends (how they helped keep him from a doctor) . . . Infancy: a frontier of science . . . Robert Koch (another pioneer scientist) . . . Aviation from the medical point of view . . . The doctor's Scotland Yard (diagnosis popularized) . . . Medical men who have loved music . . . Why the baby has eczema . . . Why worry? . . . The Black Widow (U. S. chief spider enemy) . . . Eavesdropping on the doctor (consultations reported in conversational form) . . . Eye diseases in advanced age . . . Vincent's infection or trench mouth . . . Dessert powder decisions . . . Chemists, dyes, and doctors (medical uses of dyes) . . . New books on health . . . Questions and answers.

In "School and Health Department":

Knowledge, habits and attitudes . . .
 Health teaching in June . . . Solving
 health education problems . . . Testing
 the hearing of kindergarten children . . .
 County fair features (school health aids ex-
 hibited) . . . Making children milk con-
 scious . . . New health books for teach-
 ers and pupils.

Discussion of Discussion—For the June, 1935, annual meeting of American Home Economics Association a session was announced on "The Function of Discussion in Education." A panel was to discuss:

What is the unique contribution of the discussion method and the philosophy on which it is based to the educative process? How does the symposium differ? What are the outstanding advantages and limitations of each?

The June-July, 1935, issue of *Journal of Home Economics*, Baltimore, provide a background material through an article by E. C. Lindeman on "The Place of Discussion in the Learning Process."

This department of the *Journal* urges that the P. H. E. Section and other health groups discuss discussion and other aspects of better and better meetings of health workers. Until our members and friends become "meeting conscious" we cannot make much headway in having the most useful meetings at conventions and elsewhere.

Standards for Training Health Teachers—We have the following request from a professor of bacteriology in a state teachers' college:

Has the American Public Health Association set up any standards for the training of health teachers for high schools? There is a need in the state of teachers qualified to teach health and I should like to know what is considered adequate preparation.

Any information you can give me that will be useful in preparing a curriculum for such teachers will be appreciated.

We will be glad to forward letters of suggestion.

SAFETY

"Industrial Safety," a pamphlet made up of 10 smaller booklets on industrial safety principles and their application. Metropolitan Life Insurance Co., New York, N. Y. *Free*.

"Not So Noisy But Safer and Saner." Maryland Dept. of Health, Baltimore.

"Preventing Fireworks Accidents," by Alfred E. Smith (the former Governor of New York). *Sight-Saving Review*, 50 W. 50th St., New York, N. Y. March, 1935. *50 cents*.

"Victims of Speed Mania, Unite!" by T. F. Gullixson. *Christian Century*, 440 S. Dearborn St., Chicago, Ill. March 27, 1935. *15 cents*. Appeal for limitation of speed and power of cars.

A wealth of material for various uses in classroom and in the home appears in the monthly issues of *Safety Education*, National Safety Council, 1 Park Ave., New York, N. Y. \$1.00 a year. Sample copy *free*.

FOR EDUCATION AND REFERENCE

"Concerning the Better Half of Life: Health after Forty." John Hancock Mutual Life Insurance Co., Boston, Mass. *Free*. How "the more fortunate ones learn the fine art of living. They make the second half of life the better half."

"Keeping the Well Baby Well." 8 page folder. U. S. Children's Bureau, Washington, D. C. Single copies, *free*.

"Nutrition Charts," by Bureau of Home Economics, Dept. of Agriculture. Sold by Supt. of Documents, Washington, D. C. Set of 11, black and white, 15 by 23 inches. *50 cents*.

The Nutrition Charts issued by the Bureau of Home Economics are available again in revised and expanded form. As before these charts show pictorially the results of feeding experimental diets to laboratory rats and guinea pigs. Following two charts of a general nature entitled "Growth as an index of nutrition," and "Growth may be controlled

by diet," the series shows contrasting photographs of animals that were fed on good diets and on diets deficient, respectively, in protein, calcium, phosphorus, and vitamins A, B, C, D, and G. Another chart, emphasizes the importance of iron. Each chart carries, with appropriate legend, a picture of the common foods that supply that particular food constituent, thus serving as a guide to the individual in choosing a diet to safeguard health.

A "true-false" test on tuberculosis lists 21 statements, with blanks for inserting "true" or "false." The correct answers are hidden by a fold of paper until you have tested yourself. California Tuberculosis Assn., 45 2d St., San Francisco, Calif. Enclose 3 cents. The true-false test is one of the modern examination methods which might be used more widely, especially in view of the widespread interest in information devices and contests.

The following reprints from *Sight-Saving Review* and other sources are offered by National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y.:

"The Broad Basis for Prevention of Blindness," by Edward Jackson. 10 cents.

"The Causes and Prevention of Blindness," by A. J. Bedell.

"Community Enterprise in Preventing Blindness," by C. E. Kerby. 10 cents.

"Contribution of Statistics to the Prevention of Blindness." 20 cents.

"The Control of School Myopia," by N. B. Harman. 5 cents.

"Corrective and Protective Eye Goggles for Coal Mine Employees," by E. McAuliffe. 5 cents.

"Eye Health for Atypical Children," by L. H. Carris. 5 cents.

"Eye Hygiene at Home and at Work," by W. H. Snyder. 10 cents.

"Leisure Time Activities for Sight-Saving Class Pupils," by W. Hathaway. 5 cents.

"The Philosophy Underlying the Education of the Visually Handicapped," by G. D. Matlock. 10 cents.

"Preventing Blindness Throughout the World," by P. Lewis. 5 cents.

"The Sight-Saving Class as a Mental Hygiene Measure," by C. A. Flanigan. 10 cents.

"Trachoma in Wrestlers A Menace to Public Health," by G. M. Bruce. 5 cents.

"Your Children's Eyes," by J. R. Burke.

"Your Eyes and You," by C. A. Bahn. 5 cents.

BOOKS AND REPORTS*

Sedgwick's Principles of Sanitary Science and Public Health—By Samuel C. Prescott and Murray P. Horwood. New York: Macmillan, 1935. 613 pp. Price, \$4.25.

In 1901 the late Professor William T. Sedgwick published his *Principles of Sanitary Science and the Public Health*. It gained immediate favor and is still regarded as a classic in public health literature. It is needless to call attention to the great advances which have been made since that time in the fundamental sciences on which public health is based, and the changes which have taken place in administrative practice, the great health organizations which have come into being, and the vast amounts of money which have become available through public as well as private sources. We therefore welcome this new volume, the name of which has been slightly changed.

It has been almost entirely rewritten and much enlarged. Eight chapters have been largely rewritten; 6 have been changed as little as possible and retain much of the Sedgwick flavor, while 14 entirely new chapters have been written on subjects which were not included in the original work or else to replace some which have become obsolete, making in all 612 pages of text as against 362 in the old.

It must have required enormous courage and even boldness to undertake this revision. The authors recognized the impossibility of emulating Professor Sedgwick's style or of imitating his unusual and graphic methods of expression. Their modesty is becoming and we are glad to record our

judgment that they have succeeded to a large extent in their endeavors.

The book is practically a new one, complete, concise, and well written; but it is not Sedgwick, and we cannot advise those who are fortunate enough to possess the original text to shelve it. Both authors were students and afterwards colleagues of Professor Sedgwick. They have approached their task with reverence and with a high sense of fidelity. Even those who were not fortunate enough to be students of Professor Sedgwick know that he was unique in his knowledge and methods of presentation on all subjects of which he spoke or wrote. His lectures were so fascinating that many who were not enrolled in his courses attended them, and the writer has never met one of his students who has forgotten the impress of his personality. Such teachers are rarely met with and the man himself was one of those unusual characters who have illumined the profession.

While we find the book as a whole correct and up to date, there are certain statements to which exception must be taken. Table 4 contains not only inaccuracies, but inconsistencies. Koch is credited with the discovery of the bacillus of anthrax, though an accurate description of this organism was written by Rayer and Davaine in 1850. In 1860, Delafond cultivated the germ in blood, and in 1863 Davaine showed that normal blood would not produce the disease, while that carrying the germ described would. In the same year, Tigel and Klebs did filtration experiments showing that the filtrate of anthrax blood was innocuous while the retained portion would reproduce the disease. Koch discovered the spore and taught us much of the biology of the germ 26 years after its description was

* To locate reviews that appear in any issue of the American Journal of Public Health and The Nation's Health, consult the *Book Review Digest* in your public library.

given. In the same table the discovery of the tetanus bacillus is credited to Nicolaier. He probably saw it, although he described "cocci and divers bacilli" in the material obtained from his inoculations, and did not leave any description by which the tetanus organism could be recognized. The description of the spore form was given by Rosenbach, and pure cultures obtained by Kitasato.

Weichselbaum certainly did not discover the pneumococcus. Pasteur and Sternberg described it in 1881, and Koch made photographs of it the same year. Telamon, 1883, and Fraenkel, 1884, did sound work on it, so that in Europe it is frequently called the Telamon-Fraenkel organism. Weichselbaum, 1886, confirmed the importance of the germ described by them and added to our knowledge of it. The inconsistency lies in crediting Nicolaier as the discoverer of a germ which he probably saw but did not describe, and yet crediting Koch with the discovery of anthrax which had been seen and described 26 years before.

On page 226, the credit for proving the transmission of bovine tuberculosis to man is given to a number of people, especially to the German and English Commissions and the New York City Board of Health. As a fact, the first positive demonstration of this was given at the Laboratories of the State Live Stock Sanitary Board at the University of Pennsylvania in April, 1902. The demonstrations by the German Commission and the British Commission were at least 2 years after, and that of the New York City Board of Health 8 years later. Contrasted with this, Keefer, an American, is given credit with showing that the abortus bacillus is the cause of undulant fever in man. Why should not the same desire to credit American work to Americans be shown in regard to tuberculosis?

The chapter on Public Health As-

pects of Tuberculosis is concise and unusually good. Unfortunately it suggests that the organization of the National Tuberculosis Association was the outgrowth of the Laennec Society organized by Dr. Osler at Johns Hopkins. There does not seem to be any ground for this. Indeed both Drs. Osler and Welch were in favor of joining in with one of the two congresses on tuberculosis in existence about that time, both of which were repudiated by the new organization. While there were, no doubt, a number of factors at work, the letter to Dr. S. A. Knopf (*J.A.M.A.*, Dec. 5, 1903) was certainly the immediate and determining one.

Apart from these errors, there is little to criticise, though we believe that certified milk should have had a prominent place in the discussion of milk, since it has unquestionably done much to raise the standards.

The printing and make-up of the book are excellent, though we cannot but regret the change in format, which lessens the good flavor of the original—perhaps only a sentimental factor. Unfortunately the word "transmissible" is spelled with an "a"—no doubt due to the fact that neither of the authors was born in Boston, though they have lived there for many years, and the book is printed in New York.

We would be glad to mention especially more of the many good features of the book, but lack of space forbids. MAZYCK P. RAVENEL

Social Work Year Book, 1935—
Edited by Fred S. Hall. New York:
Russell Sage Foundation, 1935. 698
pp. Price, \$4.00.

This valuable reference work is published biennially. The present volume follows the same style and format as the 1933 *Year Book*. Part I is still "An Authoritative Record of Organized Activities," and Part II again is made up of descriptive directories of agencies

in the social field. In 1933, 836 such agencies were listed. In 1934, 990 are reported. The statistics representing the additions are interesting. The directory of national (and international) agencies contained 387 entries in 1933; 413 are listed now. The public state agencies' list of 449 is increased to 526. In the 1934 volume, 51 state-wide private agencies appear, which list is a new feature.

The Preface calls attention to the fact that the previous *Year Book* came off the press in April, 1933, 6 weeks after the Roosevelt Administration came into power. "In order to picture social work as reshaped by the momentous influences of 1933 and 1934," it is stated that all articles have been revised and mostly by new contributors. The mention of only a few of the topical articles—Public Health, Maternal and Infant Hygiene, Public Health Associations, Compulsory Health Insurance, Social Hygiene, Venereal Diseases, Health Education, Public Health Nursing—will be sufficient to indicate the interest public health workers will have in this book. The authors have been wisely selected.

This encyclopedia is a "must acquire" as a handy book of accurate information for those—and there will be many—who want a quick outline of "what is," not "what ought to be," in social work and its related fields. The *Year Book* is also invaluable in providing correct names of agencies, their addresses, the names of their executive directors, and brief sketches of their purposes and programs.

WILLIMINA RAYNE WALSH

Some Notable Epidemics—By H. Harold Scott, M.D. Baltimore: Wood, 1934. 263 pp. Price, \$4.75.

It is hard to speak highly enough of this book, not only on account of its style and character, but also because of its great usefulness. The epidemics de-

scribed are all of English origin but are none the less instructive for those living in other countries.

In the introduction the author gives his reasons for writing the book. He justifies his selection of epidemics and also his arrangement of them. The reviewer finds this very interesting and evidence of the orderly mind which has been in control of the work, but entirely unnecessary, since the most casual study shows that neither explanation nor apology is needed. We need go no further than to agree with his statement, ". . . the classical outbreaks, as we may regard them, are subjects on which all students of medical history, especially of epidemiological history, and all public health students should be informed. . . ." As the author says, he has tried to pick out the jewels from a large accumulation of medical literature and give them in a form which may interest and instruct. In this he has succeeded admirably.

He begins with the classical Broad Street Pump outbreak in 1854, the study of which—" . . . foreshadowed, almost forestalled, the bacteriological findings of thirty years later." The other epidemics analyzed follow in logical succession though not in chronological order. A typical example of this is the scarlet fever outbreak in the Parishes of St. Giles and St. Pancras in 1882, which forms a good introduction to the more widely known Hendon outbreak of 1885, which first led Dr. Power, the investigator, to suspect that the disease of cows might give rise to scarlet fever in human subjects. The outbreak at Hendon confirmed him in this view to a great extent, and it was at least proved that the disease was due to streptococci which might have been transferred from lesions of the teats to the milk by the hands of the milkers.

Those of us who are old enough will

remember the investigations of Dr. Klein, especially that in connection with the Hendon outbreak, published in a report to the Local Government Board in 1886-1887. By inoculation as well as by feeding of streptococci cultivated from human cases of scarlet fever, Dr. Klein produced characteristic symptoms, signs, and lesions of the Hendon disease.

The author of this book has done a real service to epidemiologists and students of public health, since many of these reports are difficult to obtain and all, except those fairly recent, are buried more or less deeply in official reports. While they may be found in some libraries, only a comparatively few copies are extant, and many librarians will not permit them to be taken home for study at leisure. Like most reports, they contain a considerable amount of extraneous matter from which the useful facts must be sifted. The author has done all of this work for the reader and has given all the essentials which are needed by students.

The style of the book is pleasing. It is easy to read and intensely interesting—much of it almost like a detective story, which indeed studies of epidemics resemble.

The training and experience of the author fit him peculiarly for work of this sort, and it is clear that in addition to being fitted mentally for his task, he has made good use of his opportunities. We regard the book as being necessary to every well equipped library and it should be in the offices of all health officers and teachers.

MAZÏCK P. RAVENEL

Infantile Paralysis — By George Draper, M.D. New York: Appleton-Century, 1935. 167 pp. Price, \$2.00.

Dr. Draper has presented the public with a most interesting and accurate treatise concerning our present knowledge of infantile paralysis. His style

is masterly, many of the descriptions are so impressive and so remarkably vivid that they linger long in the mind. The technical subject of poliomyelitis is clearly discussed without the employment of numerous technical terms which are so often disconcerting to the lay mind.

A short well written historical sketch is followed by a dissertation on the important subject of susceptibility, the continued study of which may some day lead us out of "the shadow of half knowledge."

Dr. Draper has brilliantly emphasized the postulate that the study of Man is essential to the study of disease. This thought permeates and enriches the entire book. Some remarkable observations are revealed in the chapter on The Nature of the Human Factor.

An impressive word picture of a case of infantile paralysis from its earliest symptoms to the end of convalescence is presented. The layman is urged to consult a physician at the onset of suspicious symptoms. Advice is also given to avoid cults and charlatans. The pros and cons of serum and vaccine therapy are discussed.

Dr. Draper's frank attitude of optimism should be most welcome and reassuring to the troubled lay mind.

Although written for the enlightenment of the layman the book contains much for the edification of the physician and medical student.

J. VERNON LUCK

Tuberculosis and the Negro in Pittsburgh — By Elsie Witchen. Published by the Tuberculosis League of Pittsburgh, 1934. 120 pp. Ill. Write the Tuberculosis League of Pittsburgh, 2851 Bedford Avenue, Pittsburgh, Pa., for a free copy.

This booklet presents the findings of the 2 year Negro health survey made by the Tuberculosis League of Pitts-

burgh. The primary objective of this study was to determine the prevalence of tuberculosis among the 55,000 colored residents of Pittsburgh but in addition much valuable information was obtained on other health problems of the Negro as well as on such important factors as housing, nutrition, occupation and economic status.

In all 8,385 persons, or 15 per cent of the city's Negro population, received a complete physical examination. An indicated case rate of 8 per cent for all forms of tuberculosis and 4.5 per cent for the active adult type of pulmonary disease in the city's Negro population brings out the gravity of the problem which not only concerns Pittsburgh but other northern cities with a large number of colored residents.

The problem is still further complicated by such factors as low economic status, poor housing and poor nutrition. Of the 3,616 persons of employable age attending a clinic, 60 per cent were unemployed, while 105 tuberculous patients slept in rooms with three or more people.

This study should be read by everyone who is interested in the health problems of the Negro.

C. ST. C. GUILD

Recording of Local Health Work—

By W. F. Walker, Dr.P.H., and Carolina R. Randolph. New York: Commonwealth Fund, 1935. 276 pp. Price, \$2.00.

All those who have attempted to devise a satisfactory system of records for a health department know how difficult a task it is. There are the practical, day-by-day uses of the forms for administrative and supervisory purposes to be considered. There are aspects of record keeping important to individual staff members. There are more remote statistical uses of records which sometimes are distorted into such

a prominent position that they seem exclusively important. To maintain a fair balance between these uses is no mean task. Fortunately the many-sided contribution of a committee has been made available in this compilation by Dr. Walker and Miss Randolph, and the work reflects a well balanced judgment in this complex field.

In his foreword to the volume, Dr. Eugene L. Bishop points out from his own experience that the use of a uniform record system by a state has every advantage and no disadvantage: "If uniformity could be extended beyond state boundaries and the same items could be reported under the same terminology throughout the entire country, the usefulness of the collected information would be immeasurably increased."

The authors have included discussions of record keeping with illustrative forms which will save many hours to those who may wish to recast their forms or their systems in accordance with this plan. Simplification and accuracy will follow the adoption of these forms, all of which have been tested in actual use.

The volume may be commended to all having to do with record systems, their design and operation, as well as their interpretation. A distinct service has been rendered to all administrators of the public health. Especially noteworthy will be the advantage to those who study current health department practices and who have felt the imperative need for just such a standard work of reference.

The final chapter is one which should be read by every worker before compiling an annual report or a statistical statement, for it condenses much practical wisdom and contains a summary of standards for the graphic presentation of facts set up by the American Statistical Association. How much more

useful and clear our reports would be if we all adhered to this set of standards!

Special appreciation is due to the Commonwealth Fund for making this expensive publication available generally at a nominal cost. CARL E. BUCK

The Doctor's Bill—By Hugh Cabot, M.D. *New York: Columbia University Press, 1935.* 313 pp. Price, \$3.00.

This volume is a significant addition to the current publications in the field of medical economics. The author, who was formerly on the faculty of the Harvard Medical School and later Dean of Medicine at the University of Michigan, is now a consulting surgeon on the staff of the Mayo Clinic. Not many medical clinicians have the breadth of social vision which Dr. Cabot shows in this study nor the willingness to face the facts so well substantiated in the recent surveys. The reader catches the spirit of an intelligent man honestly seeking the truth and essentially free from either a professional prejudice or a prior commitment to a particular solution.

As President Lowell of Harvard points out in the introduction, this book should be read not only by physicians but as well by laymen who are interested in these important aspects of personal and public health, for the author discusses the problem "with an open mind, not hesitating to criticise the

medical profession for its shortcomings, its lapses into a commercial attitude, and its lack of interest in the larger aspects of its potential functions."

Those familiar with Dr. Hugh Cabot's teaching methods will recognize his pungent style and all will find the text very readable.

Even physicians have had considerable difficulty in seeing the whole field. They are, and must be, from the very nature of their calling, intense individualists. To them Medicine still retains—thank God—some of the qualities of a religion. They take fright at the thought that profane hands may soil the Temple of their God—Service. At this point emotion is likely to come into action—and understanding goes out the door. Furthermore, they have a very real vested interest which it would not be human in them to disregard. Often enough in their opposition to change they have failed to grasp the implications of the profound economic and social changes which have been going on about them. As a result, on too many occasions they have fought a series of futile rear-guard actions which have left them still on the defensive.

The bibliography is excellent, with full reference to the important studies of European experience in this field of socialized medicine, and the text shows that the studies of others have been used in the process of stating the conclusions of one very thoughtful doctor. It is the hope of American Medicine that men with Dr. Cabot's leadership in the profession will see as clearly and take their stand as uncompromisingly.

REGINALD M. ATWATER

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Farm-City Migration Declines—City-ward migration declined about 16 per cent in 1934, and farm-ward migration about 18 per cent. 994,000 persons left cities for farms, and 783,000 left farms for cities. Due to the higher birth rate, the farm population is still gaining, however.

ANON. The Farm Situation. Bur. of Agric. Econ. 19; 5:1-5 (May), 1935.

First Quarter Mortality Relatively Low—The mortality of industrial policy holders of the Metropolitan Life Insurance Co., during the first quarter of 1935 was at a record low point, viz., 9.4 per 1,000 (annual basis). Tuberculosis was down 5.1 per cent from last year. Among other diseases which showed lower mortality than last year were cardiac, cerebral hemorrhage, acute nephritis, syphilis, and cancer. Suicide was down 11.5 per cent, and automobile accidents, 6.0 per cent.

ANON. Stat. Bull. Metropolitan Life Ins. Co. 16, 4:3-5 (Apr.), 1935.

Sources of Information in Vital Statistics—Especially valuable to the casual user of vital statistics.

Ibid. pp. 6-8.

What Proportion of Twins Are "Identical"?—About a third, according to the methods of deduction used by geneticists.

Ibid. pp. 8-9.

Our Changing Health Problems—Mortality from the common infectious diseases is less than half the rate of 30 years ago, and some have virtually

disappeared. Among the problems of today the more important are: diseases of the older ages, automobile accidents, appendicitis, and puerperal causes of death.

ANON. Quart. Bull. Dept. of Health, New York City 3, 2:21-23 (no date), 1935.

How Many Diabetics?—The Department of Health of New York City is undertaking to get an answer by taking a census through physicians. The *a priori* estimate is 100,000.

Ibid. p. 39.

Mortality Causes Contributory to Diabetes—A valuable table by age and sex. Not often seen.

Ibid. p. 44.

Typhoid Agglutination—The majority of cases of typhoid fever with no history of previous vaccination develop both H and O agglutinins, although in a few instances one type alone may present. The elimination of negative sera by a microscopic technic is recommended as a preliminary procedure to titration with the formalized H and alcoholized O antigens.

BOLE, R. Value of H and O Agglutination Technic in Routine Widal Examinations. J. Lab. & Clin. Med. 20, 6:638 (Mar.), 1935.

Comparative Tuberculosis Rates—Tuberculosis in children has decreased at a more rapid rate in Minneapolis than, for instance, in Gothenburg, Sweden, where BCG has been used to immunize children. The types of the disease causing the greatest number of deaths in Minneapolis were tuberculous meningitis, pulmonary and

miliary tuberculosis. Lymph-node and bone tuberculosis are a negligible cause of death.

BOYNTON, R. E. The Declining Death Rate from Tuberculosis in Children. *J.A.M.A.* 104, 21:1875 (May 25), 1935.

Bacteriologists and Epidemiologists, Attention—A quicker method of identifying the diphtheria bacillus than by using Loeffler's medium is described, and its possibility in identifying suspected carriers is discussed.

BRAHDY, M. B., *et al.* A Rapid Method for the Identification of Diphtheria Bacilli. *J.A.M.A.* 104, 21:1881 (May 25), 1935.

Concerning Our Blissful Ignorance in Nutrition—Concluding that one of the difficulties in the realm of nutrition is not obtaining a balanced diet, but the retention of a balanced outlook on diet, this wholesome paper reminds us of the many things we do not know about nutrition. Would that this skepticism might be more frequently preached on this side of the Atlantic.

CATHCART, E. P., and HUTCHINSON, R. Nutrition and Public Health. *Pub. Health* 48, 8:286 (May), 1935.

Typhoid in the Navy—Among the 895,680 navy personnel vaccinated against typhoid fever during the past 10 years, there were only 73 cases of typhoid fever. As would be expected, the navy typhoid rate has shown a marked reduction since the prophylactic measure was adopted, greatly accelerated over the civilian rates for the disease.

COOK, S. S. The Efficacy of Typhoid Prophylaxis in the United States Navy. *U. S. Nav. M. Bull.* 33, 2:169 (Apr.), 1935.

What Children Yell for—Only once in a long while do we find a really new idea. The children in this ward of a hospital are served whatever they want to eat in whatever quantities they ask for. The results will astonish nu-

tritionists, parents, child psychologists, and you. It would be a shame to annotate this paper which all should read.

DAVIS, C. M. Self-Selection of Food by Children. *Am. J. Nurs.* 35, 5:403 (May), 1935.

Acute Rheumatism Hereditary?—The incidence is higher among children if a parent is affected, than if both parents are unaffected. Apparently susceptibility depends upon hereditary factors. Environmental factors also appear to be indispensable to development of the disease.

FRASER, J. A., and ROBERTS, W. A. R. Family incidence of acute rheumatism. *Annals of Eugenics.* London. VI, Pt. I (Oct.), 1934.

Welcome to the Armadillo—Relapsing fever is more prevalent than is usually suspected (because of failure to use diagnostic facilities) in the Southwest. It is a disease enjoyed by man and the armadillo in addition to opossums, squirrels, and chipmunks.

GILLESPIE, J. O. Relapsing Fever in the United States. *J.A.M.A.* 104, 21:1878 (May 25), 1935.

Tuberculosis in School Teachers—In Minneapolis, school teachers and other school employees were examined for tuberculosis. Six open cases were discovered and many others presented lesions of the reinfection type. The educational opportunities presented by the examination were not neglected. That the procedure is not universally applied is a reflection on our public health consciousness.

HARRINGTON, F. E., *et al.* Tuberculosis Among Employees of the Minneapolis Schools. *J.A.M.A.* 104, 21:1869 (May 25), 1935.

Poliomyelitis Virus from Healthy Carrier—In connection with the effort to explain the recognized widespread immunity to poliomyelitis, an attempt was made to detect the virus of the dis-

ease in tonsils and adenoids from persons with no history of contact with cases. In one instance, tonsil and adenoid tissue from a 2-year-old child produced poliomyelitis in monkeys.

KRAMER, S. D. Detection of a Healthy Carrier of Virus of Poliomyelitis without History of Contact. *Proc. Soc. Exper. Biol. & Med.* 32, 7:1165 (Apr.), 1935.

International Epidemiologic Data—The "Weekly Epidemiological Record" of the League of Nations will henceforth include not only pestilential diseases but also those common in temperate climates. The bi-monthly Bulletin will in the future appear quarterly. The current issue calls attention to epidemics of cerebrospinal meningitis in the Anglo Egyptian Sudan, Japan, and parts of India.

Correspondence, and Epid. Report, League of Nations 177 (Jan.-Mar.), 1935.

Visualizing Communicable Diseases—A device is described to display a cumulative record of reported communicable disease cases to show comparisons with expected incidence.

OLESEN, R. A Communicable Disease Meter. *Pub. Health Rep.* 50, 21:702 (May 24), 1935.

Depression Ill-Health—Another report of an extensive illness survey which shows the effect of unemployment upon morbidity rates. Those hardest hit suffered the greatest increases in disabling illness. Analyses of the gross findings will appear in succeeding papers.

PERROTT, G. ST. J., and COLLINS, S. D. Relation of Sickness to Income and Income Change in Ten Surveyed Communities. *Pub. Health Rep.* 50, 18:595 (May 3), 1935.

Antibodies in Antimeningococcus Serum—Using Miller's mucin method for stabilizing the virulence of strains of meningococci, antimeningococcus sera have been tested for the presence of protective antibodies. Two

methods were used: Varying dilutions of serum were employed or the time varied between the inoculation of the culture and the injection of a constant amount of serum. Polyvalent and homologous sera gave very nearly equal results, with a slight advantage for the polyvalent serum. Some slight protection was obtained with heterologous sera.

RAKE, G. A Method for Titrating the Protective Action of Antimeningococcal Serum. *Proc. Soc. Exper. Biol. & Med.* 32, 7:1175 (Apr.), 1935.

Venereal Disease Control—Discussing the measures to be applied in New York City for an attack upon the venereal diseases—including medical, epidemiologic and educational projects—the suggestion is made that a special time be set aside, like the early diagnosis campaign for tuberculosis, for special and intensive propaganda against gonorrhea and syphilis.

RICE, J. L. Public Health Aspects of a Venereal Disease Program for New York City. *New York State J. Med.* 35, 10:533 (May 15), 1935.

Adult Immunity to Diphtheria—A comparison of adults who had, and had not, received antitoxin in childhood indicates that the childhood injections may have had some influence upon adult immunity, but that this influence can be outweighed by other factors. The degrees of immunity found among adults varied greatly.

SUGG, J. Y., *et al.* The Individual as a Factor in Antidiphtheria Immunity. *Am. J. Hyg.* 21, 3:562 (May), 1935.

Storage of Water Samples—Behavior of bacteria in stored water samples is dependent not only on the temperature of storage, but it varies with the particular strains of bacteria present. After 48 hours in the refrigerator (0°-7° C.) the number of viable organisms had varied but slightly from the original. Icing of samples as

provided in Standard Methods is desirable.

TANNER, F. W., and SCHNEIDER, D. L. Effect of Temperature of Storage on Bacteria in Water Samples. *Proc. Soc. Exper. Biol. & Med.* 32, 6:960 (Mar.), 1935.

Controlling Yaws—Although American sanitarians have for the most

part only an academic interest in yaws, this statement of the possibilities in control through case finding, treatment, and follow-up as demonstrated in Jamaica will be found to be a statement of epidemiologic principles of more general application.

TURNER, T. B., *et al.* Yaws in Jamaica. *Am. J. Hyg.* 21, 3:483 (May), 1935.

BOOKS RECEIVED

DRUGS AGAINST MEN. By Henry Smith Williams. New York: McBride, 1935. 184 pp. Price, \$1.75.

TWELVE HOURS OF HYGIENE. By F. L. Meredith. Philadelphia: Blakiston, 1935. 387 pp. Price, \$1.90.

THE WOMAN ASKS THE DOCTOR. By Emil Novak. Baltimore: Williams & Wilkins, 1935. 189 pp. Price, \$1.50.

DIET AND LIKE IT. By Mabel E. Baldwin. New York: Appleton, 1935. 230 pp. Price, \$2.50.

RECORDING OF LOCAL HEALTH WORK. By W. F. Walker and Carolina R. Randolph. New York: Commonwealth Fund, 1935. 275 pp. Price, \$2.00.

BACTERIOLOGY FOR NURSES. By M. A. Smeeton. 4th ed. New York: Macmillan, 1935. 352 pp. Price, \$3.00.

PRINCIPLES AND PRACTICE OF HYGIENE. By Dean Franklin Smiley, Adrian Gordon Gould, and Elizabeth Melby. 2d ed. New York: Macmillan, 1935. 495 pp. Price, \$2.50.

FOODS AND THE LAW. By Alexander P. Blanck. New York: Peter Smith, 1935. 246 pp. Price, \$2.50.

NURSING MENTAL DISEASES. By Harriet Bailey. 3d ed. New York: Macmillan, 1935. 258 pp. Price, \$2.50.

INTRODUCTION TO PSYCHOLOGY. With Special Applications to Nursing and Nursing Problems. By Edward S. Robinson and Virginia Kirk. New York: Macmillan, 1935. 364 pp. Price, \$2.50.

EMOTIONS AND BODILY CHANGES. A Survey of Literature on Psychosomatic Interrelationships 1910-1933. By H. Flanders Dunbar. New York: Columbia University Press, 1935. 595 pp. Price, \$5.00.

SCIENCE AND THE PUBLIC MIND. By Benjamin C. Gruenberg. New York: McGraw-Hill, 1935. 196 pp. Price, \$2.00.

CLINICAL MANAGEMENT OF SYPHILIS. A Handbook for Everyday Practice. By Alvin Russell Harnes. New York: Macmillan, 1935. 71 pp. Price, \$1.50.

MALDEN HEALTH SERIES, REVISED. By C. E. Turner and Others. Boston: Heath, 1935. The Voyage of Growing Up, \$.60; In Training for Heath, \$.60; Community Health, \$.84; Physiology and Health, \$.96.

REPORTS OF THE NATIONAL QUARANTINE SERVICE, SERIES V, 1934. Edited by Drs. Wu Lien-teh and C. Y. Wu. Shanghai: National Quarantine Service, 1935. 233 pp.

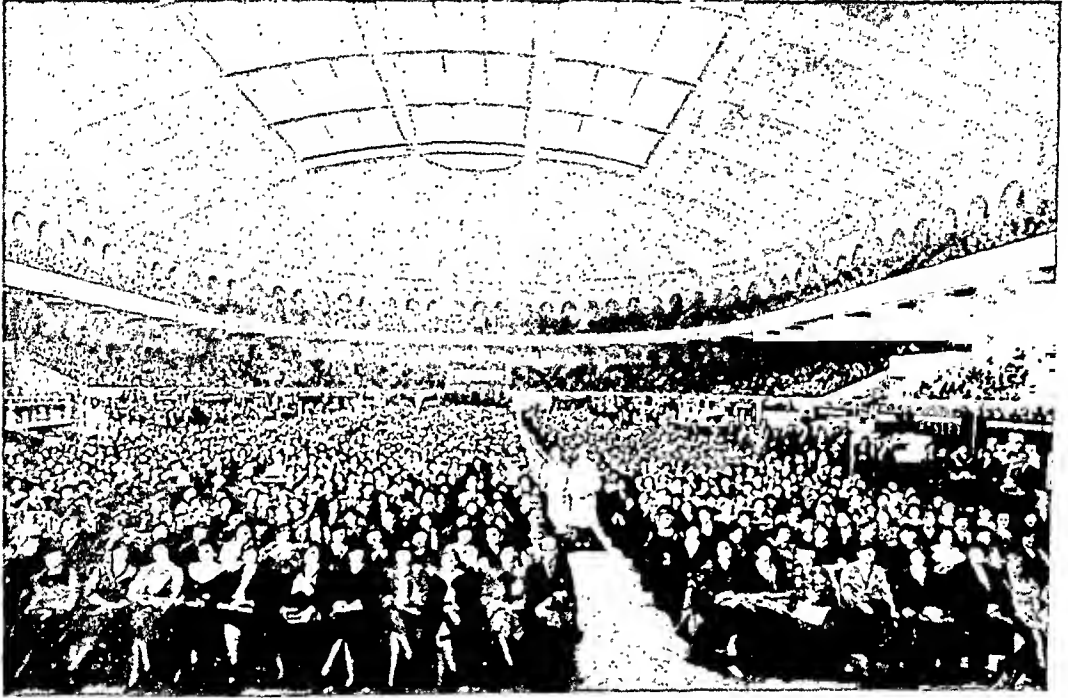
FRENCH MEDICINE. By M. Laignel-Lavastine and M. Raymond Molinery. Translated by E. B. Krumhaar. New York: Hoeber, 1934. 187 pp. Price, \$2.50.

LEITZ ULTROPAK — A NOVEL MICROSCOPIC METHOD DISCLOSING STRUCTURAL DETAILS NOT POSSIBLE WITH THE CONVENTIONAL MICROSCOPE. 32 pp. Free upon application to E. Leitz, Inc., 60 East 10th St., New York, N. Y.

WHAT SCIENTISTS SAY OF LEITZ ULTROPAK. 32 pp. Free upon application to E. Leitz, Inc., 60 East 10th St., New York, N. Y.

ASSOCIATION NEWS

MILWAUKEE TRIPS OF SCIENTIFIC INTEREST



Milwaukee Auditorium Arena

GUESTS of Milwaukee at the 64th Annual Meeting of the American Public Health Association, October 7 to 10, will find a variety of places of scientific interest to visit. Dr. John P. Koehler, Commissioner of Health and General Chairman of the Local Committee, has an excellent sub-committee on inspection trips at work on this feature of the program.

There will also be boat trips and other entertainment typical of Milwaukee, including visits to the famous breweries, to the Carnation Milk Company plant at Oconomowoc, a tea at Milwaukee-Downer College for women, a drive through the county park system, to certified dairy farms, and to the beautiful housing development at Kohler.

Many health workers will be interested in the new Matthew Keenan Health Center, a \$200,000 gift to the city. This center concentrates offices for existing health department services on the northwest side where they may be better utilized by the general public and private physicians. Its services include: consultation and diagnosis in chest conditions, X-ray examinations, immunization clinics for diphtheria, smallpox, typhoid fever, and scarlet fever; two dental clinics for indigent children; eye, ear, nose and throat diagnosis and consultation, and child welfare clinics. The center is also headquarters for northwest side field nurses and sanitary police.

Milwaukee has a \$13,000,000 sewage disposal plant which is reputed to be

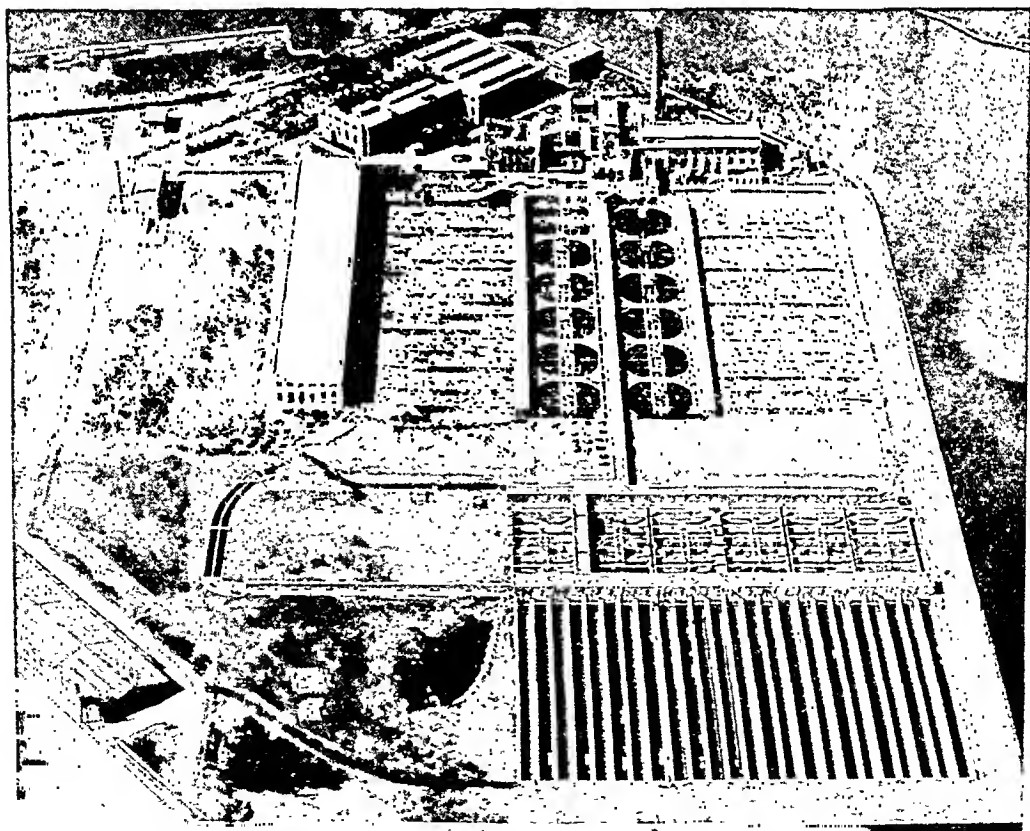
one of the pioneer activated sludge plants to be put in operation. It occupies an area of 58 acres, has a capacity of 160 million gallons daily, and serves a metropolitan district of 152 square miles with approximately 112 miles of main and intercepting sewers.

The Milwaukee County institutions are located just west of the city and include an infirmary, a 1,000 bed county hospital, asylum for chronic insane, hospital for mental diseases, home for dependent children, Muirdale Tuberculosis Sanitarium, and Bluemound Preventorium. These institutions occupy a tract of 1,100 acres which is beautifully landscaped and arranged. Another one of the county buildings, the Dispensary-Emergency unit, is located near the center of the city.

The Bluemound Preventorium is the only institution of its kind in Wisconsin

and medical experts agree that it is doing the most effective anti-tuberculosis work in the state. It comprises ten buildings and cottages, and has been called Milwaukee's nearest approach to a nudist colony—a pair of trunks being the regulation uniform of the children it houses. Only two of the 1,900 children who have been cared for at Bluemound Preventorium in its 9 years of work have later been obliged to enter Bluemound Tuberculosis Sanatorium for treatment.

The Milwaukee Vocational School, just across the street from the convention headquarters in the Auditorium, is one of the first and foremost schools of this type in the United States. The school occupies an entire city block, is valued at \$5,000,000, and contains several hundred classrooms. It has two auditoriums, one of which seats 2,000



The Milwaukee Sewage Disposal Plant



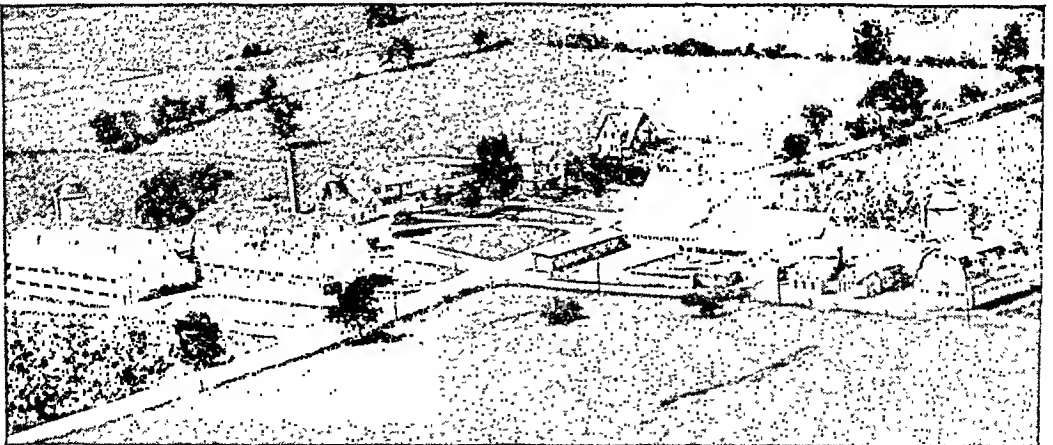
Blue Mound Preventorium, Milwaukee

people. There are 202 faculty members, and nearly 30,000 students. Among the 203 courses offered, there is academic instruction for about 400 student nurses being trained in the city's hospitals, and industrial rehabilitation work is conducted for crippled students and those injured in industry.

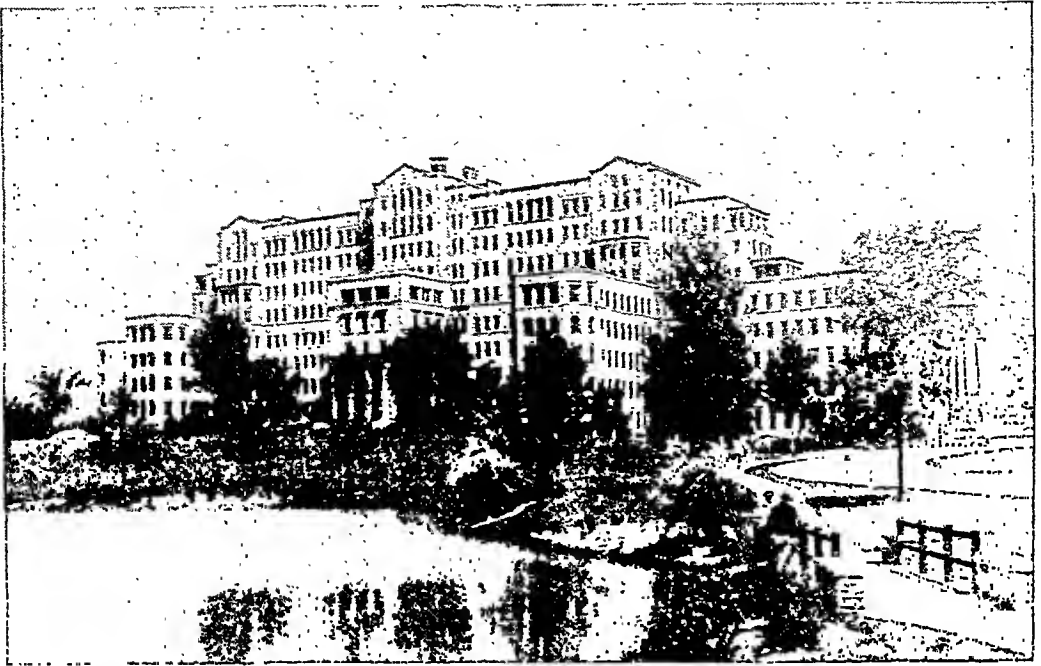
Milwaukee-Downer College is one of the outstanding, accredited women's colleges of the country. In addition to

other courses, it offers degrees in nursing and occupational therapy. The occupational therapy course requires 5 years of academic work with 9 months of practise training, and leads to a Bachelor of Science degree.

The new Marquette University Medical School is located within walking distance of hotels and the Auditorium. It has an interesting display of pathological specimens, and the building is



One of Milwaukee's Certified Milk Farms



Milwaukee County General Hospital

part of a health unit, embracing the physical education department, a dental school with a 150 chair clinic, the student health service, and an eye, ear, nose and throat hospital and clinic. Dr. Eben J. Carey, Dean of the Medical School, will be recalled as the director of medical exhibits at the Century of Progress exposition in Chicago.

A trip is being arranged to the Milwaukee Children's Hospital Convalescent Home 10 miles west of Milwaukee. This is a 50 bed institution made possible by gifts of charitable Milwaukeeans, one of whom donated the \$250,000 building and 80 acre grounds. It is a unit of Children's Hospital, and provides ideal facilities for long-time cases requiring rest and expert care.

Milwaukee also boasts the largest municipally owned museum in the country. It is located near the Auditorium and has a magnificent collection of historical relics and scientific curios. The Milwaukee Museum is famous for its early American characterization. Among the case exhibits special mention should be made of the "Old Time

Pharmacy" and the botany halls. As Milwaukee claims to be the birthplace of the typewriter, visitors will enjoy the typewriter exhibit being developed.

Visitors will also be welcomed at the new \$10,000,000 Milwaukee County Court House and administrative building which is located just three blocks from the Auditorium on an elevated site which overlooks the central business district.

The city's new \$5,000,000 water purification plant is now under construction on the shore of Lake Michigan, and by October may be in shape for the inspection of delegates to the convention.

Milwaukee has 9 fresh air rooms, and also schools for handicapped children. Among these is the Lapham Park School for Crippled Children which houses 140 youngsters, of whom about 60 are infantile paralysis cases.

It also conducts, through the Department of Health, 27 child welfare clinics, and numerous preschool clinics in cooperation with various women's organizations.

One more feature worth mentioning is that Wisconsin, as a rule, has its most delightful weather in the fall, and an opportunity will be offered to visit some of its hundreds of lakes, resorts,

and natural beauty spots, many of them near Milwaukee. The Wisconsin Dells, located northwest of the city, is one of the country's outstanding scenic attractions.

ANNUAL MEETING INFORMATION

RAILROAD RATES FROM VARIOUS CENTERS TO MILWAUKEE, WIS.

<i>From</i>	<i>Regular Rate One-Way</i>	<i>Special Round-Trip Fare and one-third</i>	<i>Lower Berth One-Way</i>	<i>Upper Berth One-Way</i>
Atlanta, Ga.	\$24.83	\$33.11	\$5.50*	\$4.40*
Baltimore, Md.	30.33	40.44	8.25*	6.60*
Boston, Mass.	39.18	52.24	10.13*	8.10*
Buffalo, N. Y.	21.36	28.48	5.63*	4.50*
Chicago, Ill.	2.55	3.40	Parlor Car Seat	.50
Cincinnati, Ohio	12.81	17.08	3.75*	3.00*
Cleveland, Ohio	14.81	19.75	3.75*	3.00*
Dallas, Tex.	30.40	40.54	7.00*	5.60*
Denver, Colo.	31.64	42.19	7.25*	5.80*
Detroit, Mich.	12.36	16.48	3.75*	3.00*
Duluth, Minn.	11.30	15.07	3.00	2.40
Fort Worth, Tex.	30.40	40.54	7.00*	5.60*
Indianapolis, Ind.	9.17	12.23	3.75*	3.00*
Jacksonville, Fla.	35.02	46.70	8.00*	6.40*
Kansas City, Kans.	15.55	20.74	3.00*	2.40*
Louisville, Ky.	13.35	17.80	3.75*	3.00*
Los Angeles, Calif.	68.26	91.02	15.75*	12.60*
Memphis, Tenn.	18.86	25.15	3.75*	3.00*
Minneapolis, Minn.	6.69	8.92	2.50	2.00
Nashville, Tenn.	16.15	21.54	3.00*	2.40*
New Orleans, La.	30.68	40.91	6.75*	5.40*
New York, N. Y.	35.25	47.00	9.00*	7.20*
Omaha, Nebr.	15.51	20.68	3.00*	2.40*
Philadelphia, Pa.	32.01	42.68	8.25*	6.60*
Pittsburgh, Pa.	19.43	25.91	4.50*	3.60*
Portland, Ore.	63.92	85.23	15.75	12.60
Salt Lake City, U.	45.36	60.48	10.25*	8.20*
San Francisco, Calif.	68.26	91.02	15.75*	12.60*
Seattle, Wash.	62.17	82.90	15.75	12.60
St. Louis, Mo.	11.22	14.96	2.50*	2.00*
Washington, D. C.	30.33	40.44	8.25*	6.60*
Montreal, Can.	31.76	42.35	9.00*	7.20*
Halifax, N. S.	53.11	70.82	14.95*	11.95*
Ottawa, Can.	28.76	38.35	8.25*	6.60*
Quebec, Can.	37.41	49.88	12.00*	9.60*
Toronto, Can.	20.26	27.02	5.63*	4.50*

* To Chicago only

MILWAUKEE HOTEL RATES

Hotel	Room Capacity	Single Room		Double Room	
		Without Bath	With Bath	Without Bath	With Bath
Abbot Crest	150	\$1.50-\$2.00	\$2.25-\$3.00	\$2.50-\$3.00	\$3.00-\$4.00
Ambassador	300	....	2.50- 3.50	....	3.50- 6.00
Antlers	450	1.00- 1.75	2.00	1.50- 3.00	3.00- 4.00
Astor	230	....	2.50- 4.00	....	5.00- 8.00
Belmont	120	1.50- 2.00	2.50- 3.50	2.00- 3.00	3.00- 6.00
Carlton	90	1.50- 2.00	2.00- 2.50	2.00- 2.50	2.50- 4.50
Colonial	90	....	1.50- 2.50	....	2.00- 5.00
Globe	60	1.00- 1.50	1.75- 2.50	1.50- 3.00	2.50- 3.50
LaSalle	200	....	2.25- 3.00	....	3.00- 8.00
Martin	200	1.00- 2.00	1.50- 3.00	2.00- 3.00	2.50- 6.00
Maryland	120	1.25- 1.75	2.00- 3.00	2.00- 2.50	3.50- 5.00
Medford	310	1.50- 1.75	2.25- 3.00	2.50- 2.75	3.25- 5.50
Miller	125	1.50- 2.00	2.00- 3.00	2.50- 3.50	3.00- 5.00
New Pfister	200	2.50- 3.00	3.50- 6.00	4.00- 5.00	5.00-10.00
New Randolph	145	1.50- 1.75	2.00- 3.50	2.50- 3.00	3.50- 5.50
Plankinton	300	1.75	2.00- 5.00	2.75	3.50- 8.00
Plaza	200	....	2.00- 3.00	....	2.50- 3.50
Republican	180	1.50- 2.50	2.00- 5.00	2.50- 4.00	3.50-10.00
Royal	130	1.50- 2.00	2.00- 3.00	2.00- 3.00	2.50- 5.00
Schroeder	850	....	3.00- 5.00	....	5.00-10.00
Shorecrest	450	....	3.00- 4.00	....	5.00- 7.00
Tower	200	....	2.50- 3.00	....	3.50- 4.50
Wisconsin	450	2.00	2.50- 4.00	3.50- 4.00	4.00- 7.00

.....(Cut off on this line and mail to the hotel of your choice).....

HOTEL RESERVATION BLANK FOR MILWAUKEE MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

OCTOBER 7-10, 1935

To
(Name of Hotel)

Please reserve for me rooms for persons
for the A.P.H.A. Meeting.

Single room Double room

Maximum rate per day for room \$..... Minimum rate per day for room \$.....

I expect to arrive If date of arrival is changed I will notify
you at least 24 hours in advance.

Please acknowledge this reservation.

Name

Street address

City State

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Franklyn B. Amos, M.D., State Department of Health, Albany, N. Y., Epidemiologist-in-training
 Calvin C. Applewhite, M.D., M.P.H., State Board of Health, Columbia, S. C., Surgeon, U. S. Public Health Service
 Bellfield Atcheson, M.D., 1111 Roosevelt St., Gary, Ind., Health Commissioner
 George E. Atwood, M.D., D.P.H., Waycross, Ga., County and City Commissioner of Health
 Louis Bonfield, M.D., 1870-75th St., Brooklyn, N. Y., Medical Inspector, New York City Department of Health
 Smith A. Combes, M.D., 131 Fulton Ave., Hempstead, N. Y., Health Officer
 Joseph B. Garlick, M.D., 1113 State St., Schenectady, N. Y., Commissioner of Health
 Robert B. Harkness, M.D., Charlotte, Mich., Director, Eaton County Health Department
 J. Frederick Kenzie, M.D., Prattsburg, N. Y., Health Officer, Consolidated District
 Edward L. Kingman, M.D., Newtown, Conn., Health Officer
 David L. Lieberman, M.D., Chester, Conn., Health Officer
 N. Stanley Lincoln, M.D., Mt. Morris, N. Y., Superintendent, Mt. Morris Tuberculosis Hospital
 Bryan Newsom, M.D., C.P.H., 300 Public Safety Bldg., Seattle, Wash., Assistant to the Commissioner of Health
 Charles M. Pearce, M.D., State Dept. of Public Health, Oklahoma City, Okla., Commissioner of Health
 M. A. Rogers, M.D., 75 Main St., Greenwich, N. Y., Health Officer
 George W. Ross, M.D., Port Ewen, N. Y., Health Officer
 Rafael Schiaffino, M.D., Sarandi 283, Montevideo, Uruguay, S. A., Director, Division of School Health
 Theodore H. Sills, M.D., 866 Main St., Newington, Conn., Health Officer
 Harry B. Smith, M.D., M.P.H., Town Hall, West Hartford, Conn., Superintendent of Health
 W. M. Talbert, M.D., Dept. of Health, Decatur, Ill., City Physician

Laboratory Section

Rosemary Bole, M.A., State Dept. of Health Laboratories, Columbus, O., Bacteriologist
 Henry E. Cope, M.D., 1551 D. Whitney Bldg.,

Detroit, Mich., Pathologist, Delray General Hospital
 Ferdinand C. Helwig, M.D., St. Luke's Hospital, Kansas City, Mo.
 Alfonso Jaramillo-Arango, M.D., C.P.H., Carrera 8a 439, Pereira, Colombia, S. A., Public Health Officer
 Marion H. Lippman, M.D., Rm. 609, Butler Bldg., 135 Stockton St., San Francisco, Calif., Clinical Laboratory Director
 Virginia Mix, A.B., 724 W. Magnolia St., Stockton, Calif., Bacteriologist, San Joaquin Local Health District
 Grace Mooney, B.A., 99 Linden St., New Haven, Conn., Research Assistant in Public Health, Yale University School of Medicine
 Howard J. Shaughnessy, Ph.D., State Dept. of Public Health, Springfield, Ill., Chief, Division of Laboratories
 Dixie M. Woodburn, A.B., Imperial County Health Dept., El Centro, Calif., Laboratory Technician

Vital Statistics Section

Florence G. Babcock, University Hospital, Ann Arbor, Mich., Record Librarian
 George W. Baehne, 270 Broadway, New York, N. Y., Manager, Institutional Dept., International Business Machines Corp.
 John F. Cadden, M.D., State Capitol, Charleston, W. Va., State Registrar of Vital Statistics
 Thomas W. Chamberlain, 10 Municipal Courts Bldg., St. Louis, Mo., Deputy Registrar, Bureau of Vital Statistics
 Sterling S. Cook, M.D., Dr.P.H., Bureau of Medicine and Surgery, Navy Dept., Washington, D. C., Charge of Division of Preventive Medicine
 Ralph C. Fletcher, M.A., 425 Olympia Rd., Pittsburgh, Pa., Director, Bureau of Social Research
 William McK. Gafafer, D.Sc., 185 Glenwood Ave., Leonia, N. J., Research Associate, U. S. Public Health Service
 William S. Groom, 34 W. 6 St., Cincinnati, O., Board Member, Cincinnati Public Health Federation
 Florence G. Hardy, A.B., 209 Pine St., Harrisburg, Pa., Statistician, State Dept. of Health
 Hill Montague, Jr., M.A., Life Insurance Company of Virginia, Richmond, Va., Statistician
 Jason Waterman, U. S. Public Health Service, Washington, D. C., Collecting and Com-

piling for Publication Statistics of Notifiable Diseases

Public Health Engineering Section

- Louis H. Dreier, 1947 North Ave., Bridgeport, Conn., American Sewage Disposal Co.
 Stanley Markey, A.B., 318 S. Cherry St., Eaton, O., Sanitarian, Preble County Dept. of Health
 William F. O'Connor, Jr., Ph.D., 106 Bellevue Pl., Yonkers, N. Y., Research in Sewage Disposal and Professor of Chemistry
 B. P. Rice, State Board of Health, Columbia, S. C., Sanitary Engineer Inspector
 James R. Simpson, B.S., Box 319, Blacksburg, Va., Research Fellow in Sanitary Engineering, Virginia Polytechnic Institute

Food and Nutrition Section

- Justo F. Gonzalez, M.D., Calle Paysandu #1282, Montevideo, Uruguay, S. A., Professor of Hygiene
 Emanuel Kaplan, Sc.D., 2525 Brookfield Ave., Baltimore, Md., Chief, Division of Chemistry, City Health Department
 F. Arnold Todd, D.V.M., C.P.H., 98 Park St., New Haven, Conn., Student, Yale Dept. of Public Health

Child Hygiene Section

- James E. Drake, M.D., 533 Sharp Ave., Spokane, Wash., Health Supervisor, Public Schools
 Julia C. Foley, B.S., Box 13, Rockville, Md., School Nurse
 Josephine Rera, M.D., 1146-58 St., Brooklyn, N. Y., Child Hygiene Division, New York City Dept. of Health
 Viola W. Whiteside, 137 Louvre Blvd., New London, Conn., School Nursing Division, City Health Dept.
 Eugene B. Wilson, M.D., State Dept. of Health, Albany, N. Y., Assistant Director, Division of Orthopedics

Public Health Education Section

- Roy T. Cowing, B.S., 43 Garden St., West Springfield, Mass., Student, Yale University School of Public Health
 Daniel H. Deyoe, M.D., Niskayuna, N. Y., Epidemiologist-in-training, State Dept. of Health
 Mary E. DuPont, R.N., 23 Main St., Bradford, Pa., Executive Secretary, McKean County Tuberculosis and Health Society
 Charles McDowell, M.D., 310 Kenmore Pl., Brooklyn, N. Y., Professor of Physiology and Public Health, New York Homeopathic Medical College and Flower Hospital
 Carlos E. Paz Soldan, M.D., Union Boza

#876, Lima, Peru, S. A., Professor of Hygiene, University of Lima

- James Steele, M.D., 98 Monitor St., Brooklyn, N. Y., Chairman, Williamsburg-Greenpoint Advisory Council and Medical Advisory Committee to the New York City Dept. of Health
 William F. Van Buskirk, M.S.P.H., State School for Boys, Meriden, Conn., Assistant Superintendent

Public Health Nursing Section

- Helen G. Ross, R.N., Broadalbin, N. Y., Staff Nurse, Fulton-Montgomery Health District
 Clara B. Hamilton, W. Va. State College, Institute, W. Va., School Nurse
 Agnes V. Murphy, 11 Nassau St., Boston, Mass., Assistant Director, Visiting Nurse Service, John Hancock Mutual Life Insurance Co.
 Kathryn C. Trent, Box 250, Charleston, W. Va., Director, Health & Nutrition, W. Va. Relief Administration

Epidemiology Section

- Miriam Brailey, M.D., Dr.P.H., 710 N. Broadway, Baltimore, Md., Instructor in Epidemiology, School of Hygiene and Public Health, Johns Hopkins University
 Robert E. Hickey, M.D., Rm. 608, City Hall, Milwaukee, Wis., Director of Communicable Disease Division, City Health Dept.
 Nels A. Nelson, M.D., Rm. 546, State House, Boston, Mass., Assistant Director, Division of Communicable Diseases, State Dept. of Public Health
 Edward C. O'Brien, M.D., Rm. 25, Municipal Courts Bldg., St. Louis, Mo., Epidemiologist, Division of Health, Dept. of Public Welfare
 Leslie T. Webster, M.D., 66th St. and York Ave., New York, N. Y., with Rockefeller Institute

Unaffiliated

- Ralph Horton, M.D., N. Y. State Tuberculosis Hospital, Oneonta, N. Y., Superintendent
 Leo C. Mundy, M.D., 391 Scott St., Wilkes-Barre, Pa., Medical Relation Board, Luzerne County Medical Society
 Frank A. Wilcox, M.D., 415-16 St., West New York, N. J.

DECEASED MEMBERS

- Mae E. Mathers, R.N., Ashland, Va., Elected Member 1934
 Lucy Minnigerode, R.N., Washington, D. C., Elected Member 1924
 Mrs. Joseph Sanders, Washington, D. C., Elected Member 1933

NEWS FROM THE FIELD

MARYLAND CONFERENCE OF HEALTH OFFICERS

ON MAY 31-June 1 there was held in Baltimore a very well attended Conference of Health Officers under the direction of Dr. Robert H. Riley, F.A.P.H.A., Director of the State Department of Health.

Maryland is a state very favorably situated for such a conference with the resources of the Johns Hopkins School of Hygiene and Public Health available, and full use was made of these and of the Baltimore City Department staff. The State of Maryland has succeeded in attracting a very well trained group of health officers and other personnel in its system of county health units which now embraces every county in the state with full-time service.

Speakers at this conference from other states included Dr. Henry D. Chadwick, Commissioner of Public Health of Massachusetts, Dr. Stanley Osborn, of Connecticut, Dr. E. A. McLaughlin of Rhode Island, Dr. R. A. Vonderlehr, Dr. Milton V. Veldee, and Pearl McIver of the U. S. Public Health Service, Dr. George C. Ruhland of Washington, D. C., Dr. W. A. McIntosh of the Rockefeller Foundation, and Dr. Reginald M. Atwater, Executive Secretary of the A.P.H.A.

CANADIAN NATIONAL HEALTH CONFERENCE

FOUR Canadian health organizations held a combined conference in Toronto June 3, 4, and 5 with a large and representative attendance from all parts of the Dominion. The Canadian Public Health Association held its twenty-fourth annual meeting at this

time and with it were combined the Ontario Health Officers' Association, the Canadian Tuberculosis Association, and the Canadian Social Hygiene Council. This grouping of agencies with much of mutual interest was reminiscent of meetings of the American Health Congress of 1926 in which many of the groups affiliated in the National Health Council met together. These associations have so much in common that it is not surprising that the occasion resulted in stimulating meetings of each group and of the groups as a whole for the consideration of matters of general interest.

In addition to the many members and Fellows of the A.P.H.A. from Canada who were in attendance, the American Public Health Association was represented by Dr. Eugene L. Bishop, President, who was on the program, Dr. John A. Ferrell and Dr. Clarence L. Scamman of the Executive Board, and Dr. Reginald M. Atwater, Executive Secretary. Dr. H. E. Kleinschmidt of the National Tuberculosis Association also spoke on "Modern Medicine's Promise to Abolish Tuberculosis."

The Canadian Public Health Association has chosen Vancouver, B. C., as the place of the next meeting which it is hoped to hold in conjunction with these same organizations and in addition with the Western Branch of the A.P.H.A. and possibly the Canadian Medical Association.

3-CENTS-A-DAY HOSPITAL PLAN

ON MAY 7, Fannie Hurst, the novelist, became the first subscriber to New York's new 3-cents-a-day plan for hospital care. Meetings are

being held throughout the city to discuss the plan with the speakers sent out by the United Hospital Fund, which is sponsoring the service.

Groups of at least 10 persons, half of whom must be employed or gainful workers, may join. No one more than 65 years old will be accepted. Applications are accepted from groups of New Yorkers or suburbanites living within 50 miles of the city.

While in the hospital, members are entitled to 21 days of semi-private care if needed, which includes bed and board, general nursing care, routine laboratory examinations, ordinary X-rays, use of the operating room, routine medications and dressings, and all other customary routine services which may be prescribed by the doctor. Maternity hospital care is also included after the patient has been a member of the plan for 10 months.

The benefits are available immediately in cases of accident or emergency illness, and after 10 days from the date of the first monthly subscription payment for other illness.

INSTITUTE OF GOVERNMENT

THE Seventh Annual Institute of Government was held, June 10 to 14, in the School of Government of the University of Southern California, Los Angeles. Among the subjects considered were Hospital and Institutional Management, Public Health, Public Welfare, and Water Supply and Sanitary Engineering. Walter H. Brown, M.D., F.A.P.H.A., President-Elect of the A.P.H.A., and Abel Wolman, C.E., Life Member, A.P.H.A., served on the Faculty.

JULIUS ROSENWALD FUND

AT the annual meeting of the Julius Rosenwald Fund in Chicago, May 19, \$284,000 was appropriated for the work of the year beginning July 1. The appropriations were for rural education,

medical services, and Negro welfare. The Fund will maintain a staff of 12 teachers and students who will work with schools in the southern states in an effort to give education a more direct bearing upon life in rural communities.

It was announced that the Fund will continue its active interest in health insurance, pay clinics, public health, and other organized services which will make good medical care more available to people of small incomes. Dr. Michael M. Davis is Director of the Fund's medical division.

NEW OFFICERS OF CONNECTICUT PUBLIC HEALTH ASSOCIATION

THE Secretary of the Connecticut Public Health Association reports the following new officers elected at the meeting of that organization held on May 15 at Bristol.

President—B. B. Robbins, M.D., Bristol

Vice-President—Louis J. Dumont, M.D., New Britain

Secretary-Treasurer—Ira V. Hiscock, New Haven

Board of Directors

D. C. Y. Moore, M.D., South Manchester

F. W. Wersebe, M.D., Washington

B. N. Pennell, D.V.S., New London

Marion Douglas, R.N., Hartford

Edward Schneider, Ph.D., Middletown

Milo P. Rindge, M.D., Madison

Albert E. Austin, M.D., Greenwich

Stanley H. Osborn, M.D., Hartford (ex-officio)

Raymond D. Fear, M.D., Stamford (ex-officio)

Representative on Governing Council of A.P.H.A.—Louis J. Dumont, M.D., New Britain

Alternates—Millard Knowlton, M.D., Hartford; Albert E. Austin, M.D., Greenwich

RESEARCH ASSOCIATES OF M.I.T.

FORMATION of the Research Associates of the Massachusetts Institute of Technology, a group of leaders and organizations in business and industry who will contribute to the financial support of important research, was disclosed by Dr. Karl T. Compton,

President of the Institute, at the reunion dinner of Technology alumni on June 3.

The new organization, which has a founder membership of 21, was created in recognition of the threefold value of research in stimulating leadership among members of the faculty; as a method of teaching students to apply their resources of knowledge; and in developing new discoveries with far-reaching social benefits in industry, health, safety, standards of living, and intellectual satisfaction.

The formation of the Research Associates marks the beginning of the second phase of a successful experiment which began 6 years ago when the Rockefeller Foundation made a substantial grant to permit the institute to demonstrate the value of an active program of research in the basic sciences of biology, chemistry, geology, and physics.

CAPPS PRIZE AWARDED DR. GULBRANDSEN

THE Joseph A. Capps Prize for 1934 of the Institute of Medicine of Chicago has been awarded to Lars F. Gulbrandsen, member A.P.H.A., instructor in bacteriology and public health at the University of Illinois College of Medicine, for work and his paper on "Invasion of the Body Tissues by Orally Ingested Bacteria and the Defensive Mechanism of the Gastro-Intestinal Tract." The prize of \$500, established by an anonymous donor in honor of Dr. Joseph A. Capps, is awarded annually for the most meritorious medical research by a graduate of a medical school in Chicago completed within 2 years after graduation.—*The Diplomat*, 7, 5:180 (May), 1935.

DR. STEVENSON HAS RETIRED

A COMMUNICATION from England indicates that letters from the United States are still addressed to Dr.

Stevenson as Medical Statistical Officer of the General Register Office of England. It will, therefore, probably be of interest to many readers to know that Dr. Stevenson has retired, and has been succeeded in office by Dr. Percy Stocks.

SAN FRANCISCO MORTALITY AND DEPRESSION STUDY

THE studies of health and the depression by the U. S. Public Health Service and the Milbank Memorial Fund are being continued in a white collar work project involving a house-to-house canvass of 30,000 families in San Francisco, in coöperation with the California State Emergency Relief Administration. The purpose of this survey is to determine the mortality among the families of the unemployed as compared with families of the employed wage earners, with particular reference to changes in the death rate during the depression years, 1929-1934. A. W. H.

F.E.R.A. NURSING WORK IN GEORGIA

PERHAPS the most important asset in development is the fact that all F.E.R.A. nursing work is under the direction of Abbie Roberts Weaver, whose knowledge, ability and experience insure work and goals of the highest feasible standards.

A state Child Health and Welfare Council has been organized and wherever possible local branch councils have been organized. Also there is a State Public Health Committee of the Georgia State Medical Association. This, of course, immediately secures the participation, interest, and backing of the lay public and the medical profession.

For the first time in its history, Georgia has public health nursing service for every county, the F.E.R.A. supplying this where local agencies cannot. As counties are very small, some nurses carry 3 counties.

The staff consists of: 1 state-wide

supervisor, 6 district field supervisors, 62 child hygiene nurses, and 10 tuberculosis nurses. The program includes:

1. Prenatal service
Visits and classes
2. Infant care
Instruction, group conferences, and child health clinics
3. Care of the preschool child
Instruction, clinics, conferences, arrangement for treatment when necessary
4. Immunization
Typhoid, diphtheria, smallpox (under direction of a physician)
5. Promotion of birth registration
6. A survey of crippled children and their needs
Organization of crippled children's clinics and securing treatment for them
7. Supervision of midwives in coöperation with the State Department of Health
8. Tuberculosis work in the promotion of clinics, supervision and education of patients, and obtaining treatment for them
9. Coöperation with official and non-official agencies in promoting infant and maternal welfare.
10. Assistance has been given to a special committee of the Georgia State Medical Association in making a study of maternal deaths.

Emphasis in the total program is placed on prenatal, infant, and preschool phases of public health work, and tuberculosis work.

Bedside care is given only as a demonstration.

While the above services are primarily for families on relief, they are open to other families, when eligible, at the request of physicians.

It will be seen that F.E.R.A. in Georgia has a broad, comprehensive program, built upon sound principles of public health and well coördinated with the State Department of Health and the State Medical Association. No doubt this will mean tremendous development for Public Health work in Georgia.—Helen Bond, R.N., Director, Health Center, Savannah, Ga.

X-RAY-RADIUM CONGRESS IN MEXICO

THE Latin American Congress of Physical Therapy, X-ray, and Radium will hold its first annual meeting in Mexico City from August 29 to September 5. The National University of Mexico will act as host to their North American colleagues, and the government will participate in extending hospitality to the delegates.

To facilitate the attendance of American physicians, a 19 day convention cruise has been arranged for physicians, members of their families, and friends. In coöperation with the American Express Company, five special tours to the Congress have been arranged, the S. S. Yucatan having been especially chartered for the first of these. It will also be possible to go both ways by rail, or to go one way by steamer and return by rail.

For information, address Dr. Cassius Lopez de Victoria, 1013 Lexington Avenue, New York, N. Y.

DR. ROSENAU RETIRES

MILTON J. Rosenau, M.D., since 1909 Charles Wilder Professor of Preventive Medicine and Hygiene at Harvard University, will retire this year. Dr. Rosenau is 65 years of age.

He was graduated from the University of Pennsylvania School of Medicine in 1889 and pursued graduate work at the Institute of Hygiene in Berlin, the Pasteur Institute in Paris, and the Institute of Pathology in Vienna. He was a surgeon in the U. S. Public Health and Marine Hospital Service from 1890 to 1909.

At the Indianapolis Annual Meeting of the A.P.H.A., in 1933, the Sedgwick Memorial Medal, for distinguished service in public health, was awarded to Dr. Rosenau—

... on the basis of Dr. Rosenau's long and fruitful career in the field of public health, for his remarkably successful 10 year administration of the Hygienic Laboratory of

the U. S. Public Health Service where he carried out pioneer investigations on anaphylaxis, for his practical work on disinfectants and on the pasteurization of milk, for his numerous original contributions to bacteriology and epidemiology, for his wise and inspiring participation in coöperative research upon influenza, pneumonia, and poliomyelitis, and especially for the service rendered public health workers throughout the world by his classic book *Preventive Medicine*.

Dr. Rosenau has been a member of the A.P.H.A. since 1909, and is a Charter Fellow.

NEW YORK HEALTH OFFICERS AND NURSES

THE Annual Conference of Health Officers and Public Health Nurses was held at Saratoga Springs, N. Y., June 26-28.

The New York State Association of School Physicians and the American Association for Hygiene and Baths met at the same time.

COMMUNICABLE DISEASES IN NEW YORK

A HEAVY increase in the number of cases of communicable disease handled during the first 4 months of 1935, as compared with the same period in 1934, is noted in a report of the Henry Street Visiting Nurse Service. In this period the Henry Street nurses cared for 1,944 communicable disease patients, among a total of 39,688 cases of all types. The figures for the same period a year ago show 1,112 communicable disease patients in a total of 38,538.

The chief reason for the increase is the fact that 1935 is a especially severe measles year. The nurses cared for 819 measles cases in the period covered as against 60 cases in the same period last year. Other figures are: 352 cases of scarlet fever, as against 256 in the same period last year; and 128 cases of whooping cough as against 79.

Fifteen or 20 years ago, the safety of taking care of communicable disease

patients in the home was considered questionable. Today, however, the visiting nurses are demonstrating every day, by following out careful technics developed through years of experience and approved by the Medical Advisory Committee and the City Health Department, that children may be cared for safely at home. Under the supervision of a visiting nurse, the family of the sick person also learns a great deal about disease control and becomes an important agent in the prevention of disease in the community.

Only 12 cases of diphtheria were recorded by Henry Street nurses, as against 23 cases a year ago, the reduction being attributed to the intensive drive for inoculation against this disease conducted by the City Health Department in coöperation with the Henry Street Visiting Nurse Service and other organizations.

ARKANSAS PEDIATRIC SOCIETY ORGANIZED

THE Arkansas State Pediatric Association was organized at a meeting in Little Rock, March 6. In addition to pediatricians, physicians especially interested in the care of the child may enjoy the clinical privileges of the society through associate membership.

The first annual meeting of the society was held April 15, during the meeting of the state medical society. Officers are Drs. Morgan Smith, chairman, and Madeline A. M. Melson, Secretary.—*J.A.M.A.*, April 27, 1935.

BLOOD DONORS' BUREAU

THE Providence Medical Association has established a bureau for professional donors of blood, at Providence, R. I. All donors have negative Wassermann reactions and normal hemoglobin and are in good physical condition.

Calls are handled through the Physicians and Surgeons Exchange. Dr.

Francis H. Chafee is chairman of the committee that established the service.

DR. FLEXNER RETIRES

DR. SIMON FLEXNER, Director of the Laboratories of the Rockefeller Institute for Medical Research since the opening of the Institute in 1903, has presented his resignation, to take effect on the appointment of his successor. He is 72 years of age. . . .

Dr. Flexner has contributed extensively to the literature on bacteriology and pathology, especially on epidemic cerebrospinal meningitis and its serum treatment; poliomyelitis, its cause and mode of transmission, and epidemic encephalitis. He, with his collaborators, was the first to use the meningococcus antitoxin. He was chairman of the U. S. Plague Commission in 1900, a lieutenant colonel in the Medical Corps of the U. S. Army from 1917, and in 1919 became a colonel and Assistant Surgeon General of the U. S. Public Health Service. In 1923 he was chairman of the Public Health Council of New York.—*J.A.M.A.*, 104, 25:2274 (June 22), 1935.

PERSONALS

CHARLES V. CHAPIN, M.D., emeritus superintendent of the Providence, R. I., Health Department, was given the Susan Colver Rosenberger Medal, the highest honor which Brown University can bestow upon an alumnus. The Award was established in 1919 and is made from time to time "for especially beneficial or notable achievement." Dr. Chapin is an Honorary Charter Fellow of the A.P.H.A.

BRIG.-GENERAL M. A. DELANEY, Assistant Surgeon General, U. S. Army, and Commandant of the Medical Field Service School, Carlisle, Pa., was the recipient of an honorary degree, Doctor of Science, from Dickinson College, Carlisle, Pa., at the

152nd Annual Commencement, June 10. General DeLaney is a member of the A.P.H.A., and was until recently Adviser in Public Health to the Governor-General of the Philippines.

RACHEL K. MILLER, R.N., member A.P.H.A., formerly with the Oakland (Calif.) Health Department, is now organizing and directing the S.E.R.A. public health nursing program in San Bernardino County, Calif., with headquarters in San Bernardino. She writes that this county has the largest area of any in the United States. It is approximately the area of the State of South Carolina.

DR. CLYDE B. HUTT has been appointed to take charge of the city-county Health Department at Vancouver, Wash., succeeding Dr. Robert W. Armstrong, resigned.

C. LEROY EWING, member A.P.H.A., Director, Bureau of Laboratories, Baltimore City Health Department, was recently elected President of the Maryland Society of Bacteriologists.

C.-E. A. WINSLOW, Dr.P.H., Fellow and Life Member of the A.P.H.A., of Yale University, was reelected President of the Connecticut Society of Mental Hygiene at its 27th annual meeting in Bridgeport, Conn., held May 20. This was a joint meeting with the Bridgeport Society of Mental Hygiene, which was holding its 11th Annual Meeting.

DEATHS

WILLIAM HENRY GUILFOY, M.D., Registrar of Records in the Department of Health of New York City for 29 years until his retirement in 1930, died on May 23. He was 75 years of age. The first person to take a competitive civil service examination in New York State, Dr. Guilfoy was appointed a medical clerk in the Department of Health in 1885, and served for 45 years. He gave up his work of keeping the city's vital sta-

tistics because of poor health, but recovered and regularly visited the offices of the department. He became ill a week before his death. While associated with the Department, Dr. Guilfooy saw the death rate of the city decrease from 28 per 1,000 to less than 12. He also saw the attitude of the public toward vaccination and other health measures change greatly.

DR. C. ST. CLAIR DRAKE, managing officer of the Jacksonville (Ill.) State Hospital, died on June 2 of heart disease, after a long illness. Dr. Drake entered the state service in 1912, and served until Governor Lowden's term expired. He became Associate Field Director, under Dr. Walker, of the Committee on Municipal Health Department Practice (afterward changed to the Committee on Administrative Practice) of the A.P.H.A. in June, 1925, and continued in that capacity until March, 1928. In that year he again entered the service of the State of Illinois under Governor Emmerson. Dr. Drake was a member of the Association since 1914.

MRS. WILLIAM LOWELL PUTNAM, prominent social welfare worker of Manchester, Mass., died on June 6. She was active during the War and spent large sums of money conducting a bureau of soldiers' information in Boston. In November, 1917, she was appointed by the Red Cross Casualty Bureau as the official representative from Massachusetts in Paris and Washington. Mrs. Putnam, among other positions, has been vice-president of the Household Nursing Association, member of the council of the National Child Welfare Association, and president of the American Association for the Study and Prevention of Infant Mortality. She was a member of the A.P.H.A. since 1915, and a Life Member since 1929.

CONFERENCES

July 1-3, Annual Meeting of the Montana State Medical Association, in conjunction with Sixth Annual Meeting, Western Branch American Public Health Association, Helena, Mont.

July 1-3, Sixth Annual Meeting, Western Branch American Public Health Association, Helena, Mont.

July 15-20, Royal Sanitary Institute Health Congress, Bournemouth, England.

July 16-20, Fourteenth International Housing and Town Planning Congress, London.

July 22-27, Seventh International Congress on Industrial Accidents and Diseases, Brussels, Belgium.

July 23-27, International Congress on Life Assurance Medicine, London.

July 31-Aug. 3, Annual Meeting of the American Dental Society of Europe, London.

Aug. 8-19, Fifteenth International Physiological Congress, Leningrad and Moscow, Russia.

Aug. 9, 10, North Pacific Pediatric Society, Seattle, Wash.

Aug. 10-17, Meeting of Health Section of the World Federation of Education Associations, Oxford, England.

Aug. 22-23, Central States Section of the American Water Works Association, Pittsburgh, Pa.

Aug. 29-Sept. 5, First Annual Meeting, Latin American Congress of Physical Therapy, X-ray, and Radium, Mexico City.

Sept. 20-Oct. 2, 7th International Medical Post-Graduate Congress, to be held during the World Exhibition, under the auspices of the University of Brussels, Bruxelles-Spa, Belgium.

Sept. 30-Oct. 4, American Hospital Association, St. Louis, Mo.

Sept. 30-Oct. 4, 21st National Recreation Congress, sponsored by the National Recreation Association, Chicago, Ill.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

August, 1935

Number 8

A Permanent Type of Ditch Construction

ALFRED H. FLETCHER, F.A.P.H.A.

Sanitary Engineer, Department of Health, Memphis, Tenn.

MEMPHIS has carried on an intensive malaria mosquito control program for 15 years and all money budgeted for this work has been spent on the control of the *Anopheles* breeding in the ditches and bayous. A total of approximately \$140,000, excluding administrative and premise inspection costs, has been expended by the city during the years 1920 to 1934 inclusive, starting with an allotment of about \$4,000 a year for a city of 24.3 square miles and a population of 162,351; and increasing to an allotment of about \$13,000 a year for a city of 48.2 square miles and a population of 268,358. Until 1930, this money was expended solely for oiling all ditches once every 10 days, or as nearly every 10 days as is possible, with a small amount of ditching and cleaning of water courses during off seasons. In 1930 a small cooperative experimental project of lining about 1,000 feet of ditch with concrete was carried out at the suggestion of J. A. LePrince, with the U. S. Public Health Service furnishing the material and the city furnishing the supervision and labor. All of this ditch is still intact and is satisfactory as a concrete lining. This experimental project was installed in sections using

different mixes and thicknesses to determine the most economical for general use in Memphis.

In ditching for malaria mosquito control, the ideal section of ditch is V shape with a narrow U shape center ditch within the larger main ditch. Flat bottoms, especially of dirt or in concrete culverts encourages meandering flow with frequent dams and pools. Permanently lined ditches with sodded banks prevents the ditch from scouring deeper, wider, and irregularly, eliminating the every 10 day routine oiling work. Repeated regrading, cleaning, and oiling of unlined earth ditches has proved a constant and endless task. Properly lined and stabilized ditches show a greater first cost, but are ultimately less costly and far more effective as a control measure. The maintenance cost of the ditch is practically eliminated, which in this day of intensive public building, is a very important point to a city. The problem of flood control and elimination of erosion and loss of public and private property, are other important benefits realized. With this in mind, in the C.W.A. ditching work in Memphis and later in the E.R.A. work, the concrete lining of ditches was stressed.

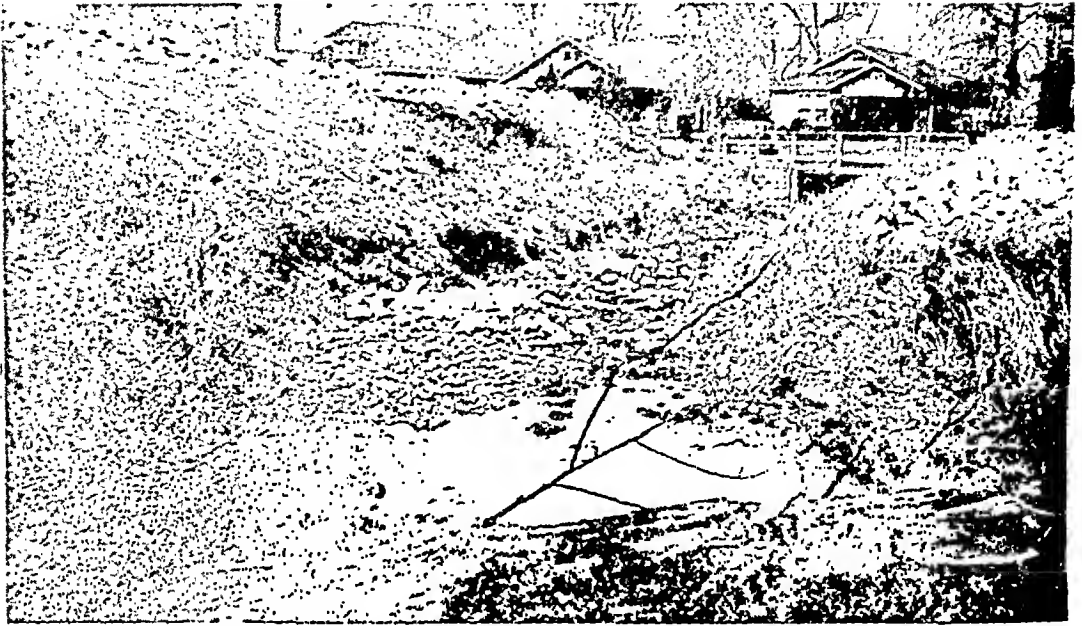


FIGURE I—Royster Bayou through a residential section at Galloway Avenue and Avalon Street, before work was done

J. A. LePrince, known to all yellow fever and malaria control workers for his outstanding leadership in this field from the first campaigns in Havana, Cuba, and the Panama Canal, to the present time, has been urging and assisting the Memphis Health Depart-

ment in this work which promises to broaden and make far more effective our malaria mosquito control program.

Out of the rush and tension of our C.W.A. struggle to accomplish as much as possible with a large force of men with hastily selected and untried or un-



FIGURE II—Same as I after lined with broken concrete pieces for walls and bottom with cement grouting and sodded banks

tested relief supervision, with adverse weather conditions and with the problems of getting labor and materials, transportation and equipment to mesh in together, approximately 6 miles of 18" concrete lining was placed in the bottom of straightened ditches. An effort was made to sod and stabilize these concrete lined ditches as the work proceeded, but only approximately 2 miles of the 6 was sodded.

In all cases, without exception, where the concrete lining was installed and the banks were sodded, there were no failures and no follow-up repair work was necessary. Sodding should in all cases immediately follow the completion of the concrete lining. In other words, with a concrete lining by itself without protection such as is afforded by sod at the edge of the concrete lining, the swift flowing water in the narrow bottom of the ditch will erode the banks and undermine the concrete lining. Erosion may also be caused by water running down the bank from the top and forming little channels which will eventually cause erosion, especially at the edge of the concrete lining. Except in special cases, this erosion can be prevented by the use of Bermuda sod. In addition, sharp bends, tree roots and other obstructions cause eddies and churning and hence are important points to protect by removing or by special treatment to prevent erosion. A comparison of unit cost of concrete or rip-rap or sod when used to stabilize the banks of the ditch above the central concrete lining, indicates that with the use of sod, there is no material cost, while with the use of rip-rap and cement grouting, the material cost is 1 cent per sq. ft. and for concrete the cost is about 10 cents per sq. ft. In addition to protecting the sides and the bottom of the ditches to prevent erosion, it is advisable to incur additional expense in many cases to straighten the ditches, as this pro-

vides for quick run-off which is beneficial from a flood control standpoint and at the same time minimizes the erosive action of the water as it goes around the sharp bends.

LOCATION AND DESIGN

A preliminary survey by walking over the existing ditch will determine whether any changes should be made in the course or line of the ditch. If any changes are considered advisable or necessary, a more detailed survey of the ditch and territory adjacent to the existing and the proposed new location should be made to determine the location of the ditch, property lines, houses, culverts, sewers, water pipes, etc. A map and profile should be drawn showing the actual location and elevations as well as a map and profile of the proposed ditch together with the elevations of all underground piping. In some cases the property lines will govern largely the course of the ditch, and in all cases easements should be secured from the owners of property affected by the changes.

The grades, dimensions of section, the location and the course or line of each ditch depend on the drainage area or watershed it serves. This area has already determined or influenced the size, grade or elevation and location of bridges and culverts through actual field data and calculations, or through estimates based on experience when this data is not available. Subdivision developers have changed the course of drainage oftentimes in order to lay off as many lots as possible. After selling these lots to many individuals, some of whom build soon after their purchase, it soon becomes impossible to straighten or change ditch locations even though they may follow a crooked course around lot corners and buildings. It is important, however, to study the possibility of changing the existing zig-zag course of many ditches to a shorter,

TABLE I
GUIDE FOR DESIGN OF LINED DITCHES
CITY OF MEMPHIS DEPARTMENT OF HEALTH

Culvert Dimensions		Ditch Dimensions						Culvert Dimensions		Ditch Dimensions					
Depth	Width	Bottom	Top	Slope	A.d.	A.c.		Depth	Width	Bottom	Top	Slope	A.d.	A.c.	
2	2	1.5	3.5	$\frac{1}{2}$ -1	5	4		5	4	1.5	6.5	$\frac{1}{2}$ -1	20	20	
2	3	1.5	4.5	$\frac{3}{4}$ -1	6	6		5	5	1.5	8.5	$\frac{3}{4}$ -1	25	25	
2	4	2.0	6.0	1-1	8	8		5	6	1.5	10.5	1-1	30	30	
2	5	3.0	7.0	1-1	10	10		5	7	2.0	12.0	1-1	35	35	
2	6	4.0	8.0	1-1	12	12		5	8	3.0	13.0	1-1	40	40	
2	7	5.0	9.0	1-1	14	14		5	9	4.0	14.0	1-1	45	45	
2	8	6.0	10.0	1-1	16	16		5	10	5.0	15.0	1-1	50	50	
3	3	1.5	4.5	$\frac{1}{2}$ -1	9	9		6	5	1.5	8.5	$\frac{3}{4}$ -1	30	30	
3	4	1.5	6.5	1-1	12	12		6	6	1.5	10.5	$\frac{3}{4}$ -1	36	36	
3	5	2.0	8.0	1-1	15	15		6	7	1.5	12.5	1-1	42	42	
3	6	3.0	9.0	1-1	18	18		6	8	2.0	14.0	1-1	48	48	
3	7	4.0	10.0	1-1	21	21		6	9	3.0	15.0	1-1	54	54	
3	8	5.0	11.0	1-1	24	24		6	10	4.0	16.0	1-1	60	60	
4	4	1.5	6.5	$\frac{3}{4}$ -1	16	16		6	11	5.0	17.0	1-1	66	66	
4	5	1.5	8.5	1-1	20	20		6	12	6.0	18.0	1-1	72	72	
4	6	2.0	10.0	1-1	24	24		8	8	1.5	14.5	$\frac{1}{2}$ -1	64	64	
4	8	4.0	12.0	1-1	32	32		8	10	2.0	18.0	1-1	80	80	

1. Minimum of 18" bottom. 2. Limits of slopes: Minimum $\frac{1}{2}$ to 1. Average 1 to 1. Maximum $1\frac{1}{2}$ to 1. 3. Three or 4 culverts or bridges should be used in establishing necessary area of ditch. In going down stream area should never decrease but increase according to increased run-off.

straighter ditch and also wherever possible to eliminate the sharp bends which interfere with the flow of water in the ditch and create eddies and scouring.

In designing the proper section of ditch for the concrete lining with sodded banks, certain limiting values are used. The most satisfactory slope used in Memphis is a $1\frac{1}{2}$ horizontal to 1 vertical. The minimum width lining is 18". The area of the lined ditch should be greater than, or equal to the area of the culvert it receives its water from, if this culvert or bridge is built to carry a definite run-off already figured for the ditch. In other cases a number of culverts and bridges should be measured and the size of ditch figured to carry at least the volume of water now carried by the existing structures. In all cases, if possible, a uniform section should be kept throughout the length of each ditch. In general, linings should be U shape to carry the dry weather flow. In wide ditches a narrow U shape section can be installed in the center with sloping rip-rap sides for the rest of the width

of the ditch. The maintaining of a uniform grade and section will minimize changes in velocity and the resultant dropping of sediment and thus prevent the forming of dams and leaving pools of water.

Table I has been computed as a guide in deciding on the proper width and slope of concrete lined ditches. In many cases, however, the actual width of a ditch may necessitate a wider bottom than shown in the table. The table is used only as a guide and to insure that all V shaped lined ditches are large enough to carry the run-off.

EXCAVATIONS

Grade and slope stakes should be set for the rough or preliminary excavation. On straight ditches the stakes should be set 50' apart, on curves about every 25' or less, and on sharp curves about 10' apart. Cutting to these stakes will bring the ditch to within a few inches of the finished ditch. Better alignment and a more satisfactory completed ditch from all standpoints can be obtained if a trench the width

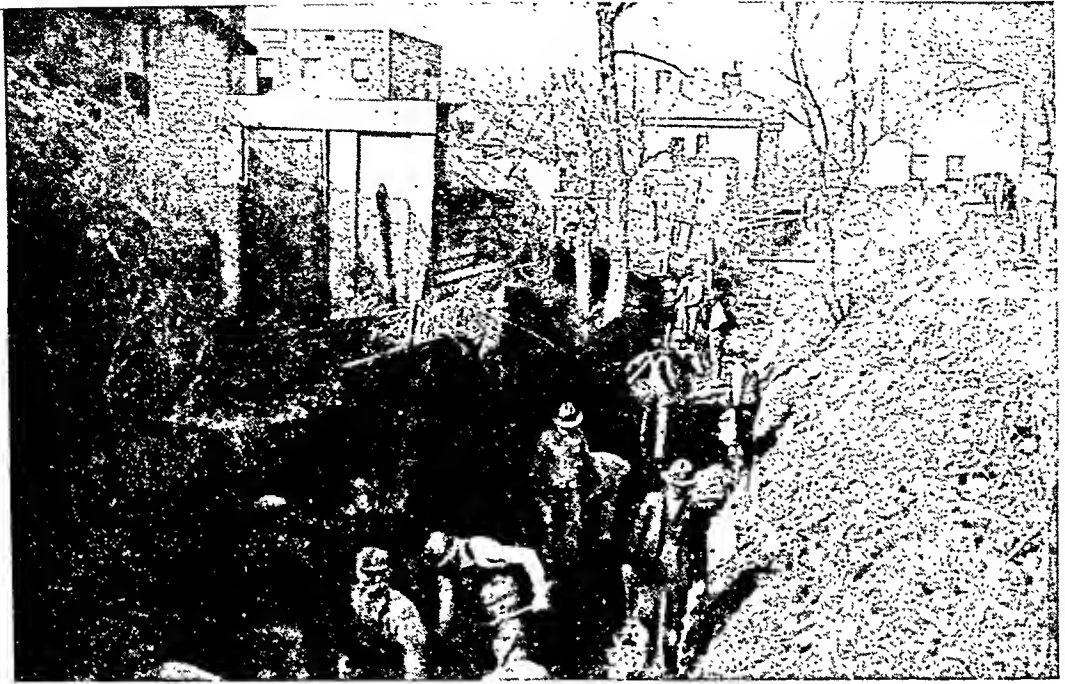


FIGURE III—Section of Madison Heights Bayou looking north toward Jefferson Avenue.
Note: Caving frame supports an old shed before much work done.

of the bottom of the ditch is dug to line and grade and then the sides sloped rather than try to do sloping

along with the other excavation. This does not apply to large ditches where "step excavation" is the best pro-



FIGURE IV—Same as III after lined with rip-rap and banks sodded

cedure. At this point the final grade stakes should be reset to finish the excavation. The top of the center line grade stake should be driven to the concrete finish grade, and the side and slope stakes should also be set to the concrete finish grade. The side stakes, that is, the ones at the outer edge of the concrete lining should be set about 6" above the center line stakes on the 18" and 24" lining. The ditch bottom is cut to 2" or 3" (the thickness of the concrete lining) below the top of the stakes. This final excavation should be done by experienced ditchers to insure a uniform bottom to grade so as to have uniform thickness of concrete. If the lining is too thin it is weak: if it is too thick it wastes concrete and money; if nails are driven into the top of the stakes and a cord pulled taut between stakes, it assists in cutting a uniform width and depth, and the cords can be used also as a guide in placing the concrete. The outside of curves is elevated just as is done in building a highway.

CONCRETE LINING

In mixing the concrete for the lining, a few fundamental rules should be observed to get the best at the least cost. A lean mix and as thin a lining as will last is, of course, the most economical. We are now using a 2" thick lining with a 1:3:5 mix using a minimum amount of water just to make the mix workable to keep the water-cement ratio low. The 18" lining has about a 6" drop from the edges to the center line. When possible to buy or borrow a concrete machine mixer, the work can be speeded up.

If the mixer is placed halfway between, or say 200' on long stretches from the upper end of the ditch and enough material placed at this point to complete the whole stretch or the first 400', time will be utilized to best advantage in not having to handle the

material and equipment any more than is necessary. The ditch would be poured from the upper end to the downstream end. If the mixer is a large one, two laying crews can be used, with each crew laying 200' in two sections at the same time.

A chute can be arranged to slide the concrete direct into wheelbarrows from the mixer. Runways placed on the bottom of the ditch, consisting of 2" boards will prevent the cutting or muddying up of the ditch bottom, as the concrete is wheeled down the ditch to where it is being placed. A thin lining should not be poured on a muddy bottom. Although expansion joints were not used in much of the C.W.A. lining work and there have been no subsequent failures, we are now using about 6 sheets of 2 ply tar paper for joints about every 50'.

On steep grades, especially where the lining is placed on a fill, or where for any other reason the water might be allowed to run under the lining, key walls about every 200' should be built at right angles and extending under the lining into a solid foundation to stop the flow of water with weep holes on the upstream side to provide outlet for the water after the rain, to seep up onto the lining. (See sketch of key wall).

In some cases where sod was not immediately placed at the edge of the lining, scouring was worse when the edge of the lining was rough. If the sod was immediately placed, the rough edge did not seem to cause any scouring.



CHART I—Sketch of Key Wall

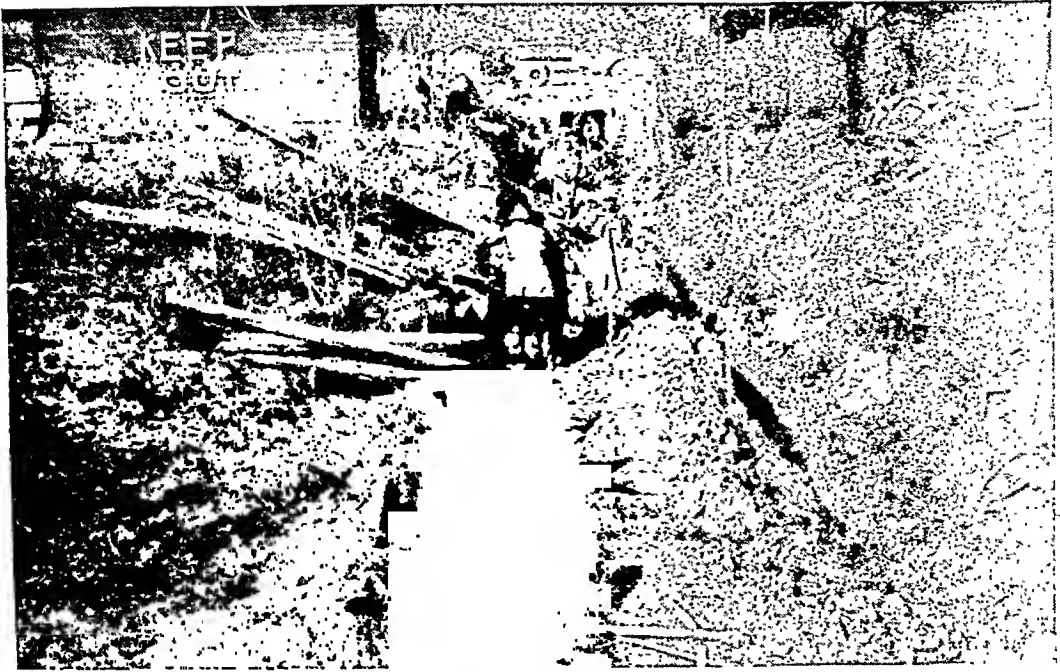


FIGURE V—Section of Madison Heights Bayou looking north toward Court Avenue before cleaning and rip-rap work done

Forms can be used without losing much time making it possible to get a smooth edge. Care should be taken to prevent any honeycombing of the concrete

at the edge and the top edge is being slightly rounded.

Even though the lining is not usually subjected to any great pressure, the



FIGURE VI—Same as V after lining bottom and sides and sodding banks

lining should not be allowed to dry out for a day or so, especially in the dry weather, in order to cure properly and prevent scaling off, pitting, or disintegration later on. No reinforcing has been used. As already emphasized, the sod should now be laid on the banks without delay.

SODDING

In sodding, the operation is divided into two steps with a sod cutting and loading crew of 8 to 10 men and a sod laying crew of 2 to 3 men. Sod is cut in strips of approximately 10" x 12" x $\frac{1}{2}$ " to 1" thick. Only thick and pure Bermuda sod is used. If $\frac{1}{2}$ " to 1" thick sod is cut and laid, the roots will grow 2" within a few weeks and thus get a firm bull-dog grip on the bank and withstand heavy flood rains, while 2" or thicker sod takes many days before the roots will extend themselves and grip the bank. If the sod has been cut too thick, heavy tamping after laying will tear loose the sod and roots and encourage more rapid growth of new roots.

Sodding is done both in hot summer weather and in the cold winter weather as the roots will grow even when the top grass does not. The bank should be dressed to a uniform grade and 1" below the top edge of the concrete lining to support the blanket of sod. The bank should not be cut below the top edge of the lining until the sod is to be laid, as the overhanging slope or bank is a protection against erosion at the concrete lining edge until the sod is laid. If the sod is being laid on a dry bank, the slope should be wet down thoroughly before laying.

As soon as the sod is placed and well tamped with shovels, it should be covered with $\frac{1}{2}$ " of earth which is accumulated from the bank as it is prepared to receive the sod. The sod blanket is extended to the top of the bank and over the top for several

inches. We have had very little success with spot sodding, and even when used only on the upper half of the banks, the repairing of the upper half for sodding after damaging rains has convinced us that we should do a complete job at first.

On deep ditches where a $1\frac{1}{2}$ to 1 slope would give a wide top, the bottom width may be increased and a rip-rap wall on a $\frac{1}{2}$ to 1 slope installed to a height of 3 or 4' and then a $1\frac{1}{2}$ to 1 sodded slope for the rest of the bank will result in a narrower top and still maintain the most desirable slope, $1\frac{1}{2}$ to 1 for dirt or sodded banks.

RIP-RAPPING

The term rip-rapping has been used in our ditching work to mean the use of broken pieces of concrete or stone with one smooth surface, as from a concrete sidewalk, floor, porch, wall or street. Old asphalt has been used but its tendency to crumble when not in use supporting traffic, has influenced us to use it for fill only. Some of our early work was with asphalt, and in years to come we will learn more about its possible use. This rip-rap may be used in big ditches for bottoms and walls or may be used on the sides of a small center concrete lining to increase the bottom width while having a concrete center lining to carry the dry weather flow. Again the rip-rap can be used in many cases to narrow a section of ditch to secure a uniform width, by building a wall and filling behind it. Shallow filling and sodding in place of a wall may be done if the existing bank is first spaded up or turned over to make a good bond between the existing and the new bank just as a roughening of an old concrete surface is necessary to secure good bond with a new layer of concrete. The wall need not be brought to the top of the bank if the bank is sloped and sodded above the wall, with the sod extending over the

top of the wall to the inside edge. In other places shade, due to bridges or trees, may make it necessary to use rip-rap in place of Bermuda. Walls may be used on sharp bends where scouring action is particularly severe.

As indicated above, some of the ditch lining installed by the C.W.A. about a year ago, was not sodded, and in cases considerable scouring and washing has taken place necessitating filling and widening the bottom and building side walls.

In constructing a complete rip-rap lining of walls and bottom, the walls are installed first. It is important in getting a uniform alignment to use slope stakes for the top and bottom and slope of the wall, usually $\frac{1}{2}$ horizontal to 1 vertical. The wall must be carefully constructed to stand and a solid foundation or footing is of first importance. The wall is begun a foot or more, if necessary, below the grade of the ditch to reach a firm foundation of dirt. The pieces of rip-rap are placed with the flat side up, not parallel to the bottom of the ditch, but perpendicular to the slope of the bank, the straightest edge is placed out as a part of the wall surface. At sections of ditch, where the velocity or scouring is severe the wall joints may be filled by slapping and brushing a 1:4 mix of cement mortar into them. Weep holes are left about every 25' to allow water entrapped behind the wall, especially in fills, to seep out into the ditch.

The bottom is built up or cut to a grade so that the flat face of the rip-rap when placed will meet the final grade line of the ditch lining. If the bottom can be lined when dry, care should be taken to have the dirt bottom firm and well tamped when fill is necessary. If the bottom is lined when the ditch is carrying a flow of water, rip-rap should be used to fill holes and a gravelly or coarse material should be used for fill with the voids filled with

dirt. As the rip-rap is laid on the bottom, each piece is placed carefully just as in building a wall, and tamped with the dirt bottom scraped away or added to make the flat piece of rip-rap lay flat and firm and to grade. A man on the bank slides pieces of rip-rap down to a man in the ditch who passes each piece to the rip-rap layer as he needs it. A half dozen or more crews may be placing rip-rap at the same time.

After all of the rip-rap has been placed, a finish man with a helper goes the entire length of the section, tamping and testing each piece to be sure all are firmly placed and to grade. On a wide bottom, a straight edge is used from the center line grade to the side of bottom grade to insure a uniform bottom with a slope to the center line for dry weather flow and no low or high places to cause water to stand.

Gravel and sand can then be brushed into the space between the pieces and tamped to "key up" the lining. A 1:4 mix of cement mortar is then brushed over and into the lining joints.

The sod should be placed on the dirt bank above and over the top of the wall and extend from the inner edge of the ditch walls to several inches over the top of the bank. It is important to tamp and settle the dirt-fill behind the wall to prevent later settling and slipping of the wall in places. If broken stone is used for fill, the voids should be filled with dirt and tamped as the fill is made and then covered with a blanket of sod.

In general, the cost of the concrete lining has run about 10 cents per square foot for material, including the cement, sand and gravel, while in the rip-rap work the only material purchased is cement and sand for grouting, as the broken concrete has been free for the hauling, and this has run about 1 cent per square foot. All sod used has been free. Because of the use of relief labor, no attempt has been made to

show unit costs of excavation or laying concrete, rip-rap, or sod. A total of 5.8 miles of ditches have been stabilized to date and a proposed project is now being submitted for lining and sodding 16.6 miles with an 18" to 24" concrete lining with sodded banks. Rip-rap will be used for walls, etc., where necessary.

SUMMARY

Lining of ditches with concrete and sodding, or with rip-rap material and sodding is being constructed in Mem-

phis with relief labor. A large force of common labor can be used with a small outlay of materials and equipment with a lasting and important influence on health. The maintenance cost is low, flood damage by erosion and loss of public and private property is stopped.

Certain lessons have been learned in constructing approximately 6 miles of ditch lining.

NOTE: The photographs included in this article were made by M. F. Carter, Memphis Health Department.

Pine Board Gavel

WHEN next year's meeting of the Western Branch of the American Public Health Association is called to order at Vancouver, B. C., Dr. W. F. Cogswell of Helena, new president of the organization, will rap sharply on the table with the official permanent gavel of the group—a common piece of Montana yellow pine board.

Rising to an emergency at this year's meeting in Helena in July, Dr. W. P. Shepard of San Francisco, secretary of the association, hurriedly found the piece of board and offered it to Dr. W.

H. Brown of Palo Alto, Calif., who was presiding.

The improvised gavel was used at most of the convention sessions and, after Dr. Brown had employed it for the final time during his presidency, Dr. Shepard had the out-going president autograph the board, which was turned over to Dr. Cogswell with instructions to have it available at next year's convention, as then and there it was proclaimed the official gavel of the organization for all future sessions. —*Montana Record Herald*, July 5, 1935.

Measles, Scarlet Fever and Whooping Cough in the Los Angeles County Health Department Area

A Ten Year Study

H. O. SWARTOUT, M.D., DR.P.H.

Assistant Professor of Public Health, College of Medical Evangelists; Emergency and Consultant Physician, Los Angeles County Health Department; Los Angeles, Calif.

THESE three "diseases of childhood" have been studied so long and written about so often that a full list of authors and titles would be bewilderingly lengthy. Nearly everything important that has been published about them has already found its way into the textbooks, with the exception of some recent developments in immunization and treatment. Since these two phases of the subject will be scarcely more than mentioned in this paper, references will be given only to a few standard works on general medicine, whose indexes and bibliographies are readily available to anybody who wishes to follow the study further.

There are several reasons why it seems worth while to present certain facts about the epidemic courses, prevalence, and severity of the three diseases as they have occurred in the Los Angeles County Health Department area.

First, the population is large enough to make the findings significant, having grown from a little less than half to a little more than three-quarters of a million from 1925 to 1934.

Second, the population is both mixed in type and markedly mobile, charac-

teristics which increase the frequency of personal contacts and which, therefore, might lead one to expect a communicable disease morbidity above the average.

Third, the area concerned is virtually sub-tropical, with no weather that can properly be called cold, and with distinct moist and dry seasons, thus differing appreciably from the areas covered by most studies on the same or similar subjects.

Fourth, the area has been under the administration of a well organized health department throughout the period, which insures comparatively dependable statistics.

Fifth, while some of the ascertained facts are in close agreement with general findings and opinions published in textbooks, others show interesting differences.

The statistical data are embodied in a series of charts, a discussion of which will make up the larger part of this paper.

Chart I shows the epidemic waves of the three diseases, based on annual case rates. Blackfan¹ mentions the regularity of measles epidemics as a generally recognized feature of the disease.

Measles, Scarlet Fever and Whooping Cough in the L.A. County Health Department Area, 1925-1934

CHART I.

Annual Case Rates

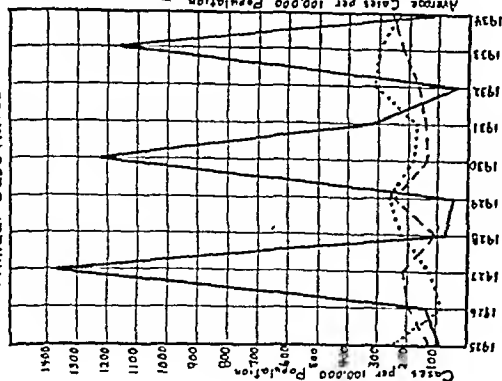


CHART II.

Average Monthly Case Rates

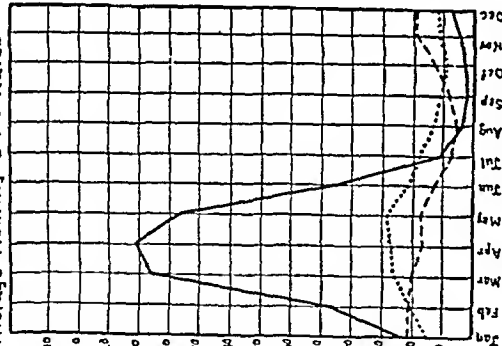


CHART V.

Annual Case Fatality Rates

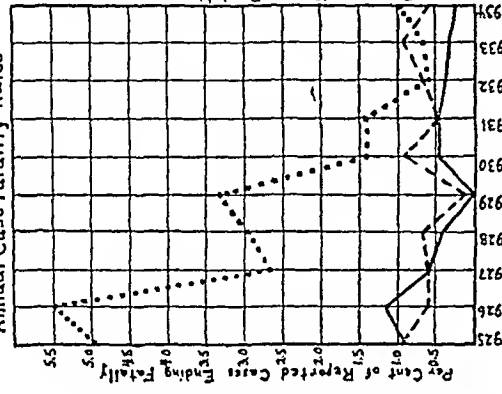


CHART VI.

Average Case Rates by Age-Groups

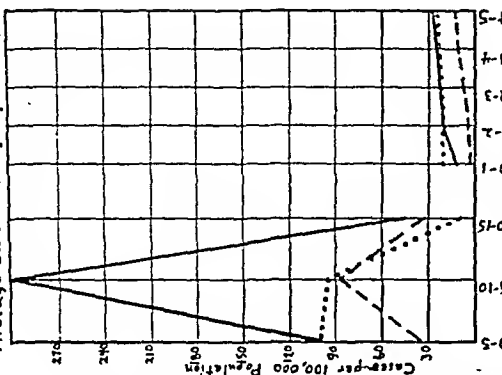


CHART III.

Average Monthly Measles Case Rates for the whole Decade, Epidemic Years, and Non-epidemic Years

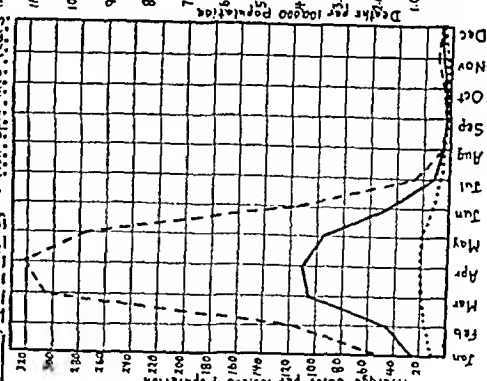


CHART IV.

Annual Death Rates

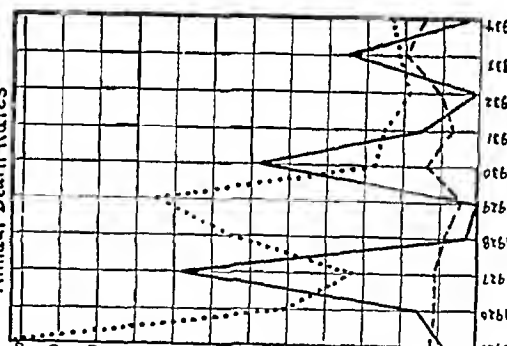


CHART VII.

Average Death Rates by Age-Groups

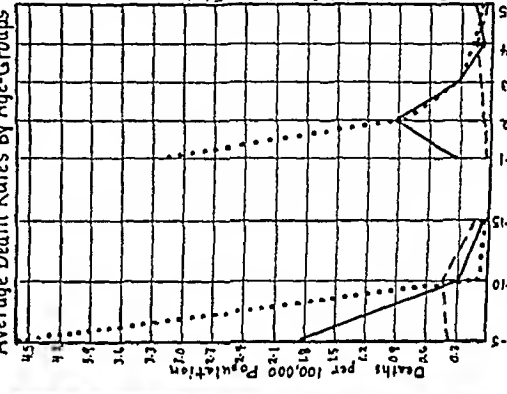
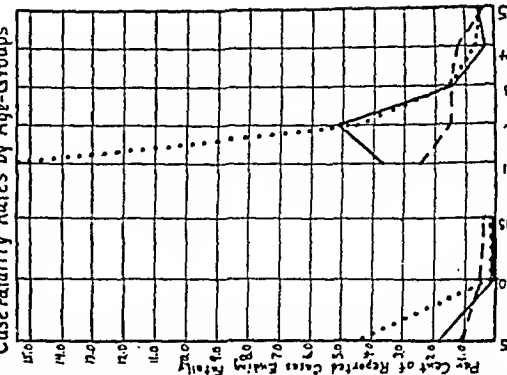


CHART VIII.

Case Fatality Rates by Age-Groups



Los Angeles County data are in agreement with this idea, for measles has been markedly epidemic there at intervals of just three years throughout the past decade. In non-epidemic years the incidence of measles has been very low. If the regularity of the wave persists, 1936 will see another measles epidemic in the county.

Scarlet fever and whooping cough epidemic waves have not shown much regularity, and the difference between the height of their crests and the depth of their troughs has not been marked. Scarlet fever peaks of moderate height occurred in 1926-1927, 1929 and 1933-1934. The whooping cough peaks came in 1925, 1929 and 1932-1933.

Chart I seems to say that little has been accomplished toward reducing the prevalence of measles, and that scarlet fever and whooping cough are becoming more prevalent. The chart, of course, is subject to the error of incomplete reporting. Those competent to judge hold that both measles and scarlet fever reporting in the area have been very good for at least ten years. Whooping cough reporting is not so good, but it is better now than it used to be ten years ago. The testimony of Chart I, therefore, is acceptable in a general way with regard to measles and scarlet fever, though it is possibly wrong in indicating an increasing prevalence for whooping cough.

Chart II shows seasonal variation in incidence by means of average monthly case rates.

While averages for corresponding months of the 10 years do not necessarily show that relatively high rates characterized the same months for most of the years, such, in fact, was true. In Los Angeles County it has been uncommon for the epidemic peaks of measles, scarlet fever, or whooping cough to occur at any other times in the year than those corresponding to the peaks in Chart II.

With respect to measles, Stevens ²

states that the maximum intensity of epidemics is usually in the winter months; Strong ³ says the seasonal incidence varies slightly in different latitudes, but is usually greatest from December to May; and Blackfan ¹ puts the greatest frequency of epidemics in winter and spring. In Los Angeles County, the greatest intensity of measles epidemics has been quite regularly between February and June, with the peak in April.

Chart III indicates that epidemic years did not dominate the measles picture with respect to seasonal incidence. The curve of measles cases for the 7 non-epidemic years rose and fell during the same months as did that for the 3 epidemic years.

It would seem that measles, generally called one of the most contagious of all diseases, should spread most rapidly when people, especially children, congregate most frequently. This thought points to the opening of school in September as the time when the measles curve should begin to rise. It does, in fact, do so; but the rise is gradual for 3 or 4 months, a longer lag than would probably occur if contagion alone were concerned. The remarkable seasonal regularity of the measles curve in Los Angeles County forces a consideration of the influence of the weather. Temperature is not the only weather factor, for the coming of cool days in November or early December does not cause a marked increase in the incidence of measles in the area. The decided upturn of the curve does, however, coincide quite closely with the early part of the rainy season, which, on the average, is well under way by the first of January. This noticeable coincidence with a season combining dampness and chilliness supports the idea of those who hold that conditions predisposing to upper respiratory infections are important factors in the rapid spread of measles.

Referring again to Chart II, it is interesting to note the combined influence of the school session and a cool and damp season on the curve of scarlet fever, the school session in this case being apparently the more significant of the two. Helmholtz⁴ also makes special mention of school term coincidence. This feature would seem to place great emphasis on contagion in connection with scarlet fever; yet it is generally considered much less contagious than either measles or whooping cough, whose curves of incidence in Los Angeles County do not follow the school term nearly so closely as does that of scarlet fever.

Stevens⁵ says that whooping cough is more severe, though not more common, in winter and spring. Levy⁶ says it is especially liable to occur during cold seasons. Holt⁷ places its prevalence mostly in winter and spring. In Los Angeles County, the seasonal curve of whooping cough is somewhat different from what these authorities would lead one to expect. Neither weather predisposing to upper respiratory infections nor attendance at school with its marked influence on contagion seems to affect the curve as promptly as would seem reasonable. The peak comes near the end of the school year, and when the weather is comparatively warm and dry.

Chart IV is an encouraging picture in some respects. It shows that while the annual death rate from scarlet fever in Los Angeles County is a little higher than it was a decade ago, measles is somewhat less of a menace to life than it was then, and whooping cough much less so. Whooping cough, however, is not much less of a life peril now than it was 4 years ago; and it still takes a larger toll year by year, on the average, than either measles or scarlet fever.

Chart V is a good measure of the relative severity of the three diseases. In it, again, scarlet fever gives no

grounds for satisfaction; but the measles curve shows that this disease has been growing definitely less deadly. As to whooping cough, while nearly 5 per cent of those reported to have the disease in 1925 died of it, and more than 5 per cent in 1926, during each of the past 3 years less than 1 per cent of the reported cases ended fatally. What has caused so marked an improvement is not clear. There has doubtless been some gain in the quality of medical and nursing care, though the depression has surely cut down on the quantity and there has been some increase in the use of pertussis vaccine, though not much; but neither of these factors nor a combination of them is at all commensurate with the decrease in whooping cough case fatality in Los Angeles County.

According to a composite view of statements from the authors already named, measles mortality, under favorable surroundings and averaged for all ages, runs from 3 to 6 per cent. In Los Angeles County, in only 1 year in the past decade did it go above 1 per cent, in 6 other years it was less than $\frac{1}{2}$ per cent, and in 1929 it was zero.

A similar study of scarlet fever leads one to expect a mortality of from 1 to 8 per cent, but in Los Angeles County it has never reached as high as 1 per cent during the past 10 years.

Stevens⁵ gives whooping cough a reputed mortality of from 3 to 10 per cent. In Los Angeles County, only 3 years in the last 10 saw a whooping cough mortality above 3 per cent; and for the past 3 years it has been below 1 per cent.

In general, the severity of the three childhood diseases — measles, scarlet fever, and whooping cough — as they occur in the Los Angeles County Health Department area, is evidently below the average for the other localities that have been studied. In the case of measles and whooping cough, this severity is definitely declining. The

data, however, do not indicate that the virulence of the streptococci causative of scarlet fever is decreasing in that area, a condition which has been suggested as possibly obtaining in our country as a whole.

Chart VI shows how age affected the incidence of the three diseases. Both measles and scarlet fever showed a fairly steady increase during the first 5 years of life. Multiplying opportunities for contagion as the children widened the circle of their activities and added to the number of their playmates may have been enough to account for this increase. With whooping cough, the incidence ran nearly the same for each of the first 5 years, though the factor of increased likelihood of exposure was as great as in the case of the other two diseases. The total number of cases reported for the first 5 year age group was almost exactly the same as for measles, indicating that the number of susceptibles in the population did not differ much for these two diseases. A study of all these findings leads one to wonder if there is not something in the idea that some not fully demonstrated physical condition or change makes children individually less susceptible to whooping cough as they grow older.

Decreased susceptibility to whooping cough continued to manifest itself during the second 5 years of life, when by entrance to school the chance of contagion greatly increased. In this respect, measles and scarlet fever told a very different story, for school entrance brought a sharp rise in their incidence.

The markedly decreased incidence of all three diseases during the third 5 years of life might plausibly be accounted for by the guess that such a large proportion of the population had already had them that few susceptibles were left. Comparing the average annual number of reported cases in children under 10 years of age with the average annual number of new suscep-

tibles born into the population with an expectancy of living to the age of 10 years gives an approximate estimate of the comparative numbers of susceptibles and nonsusceptibles in the population 10 years old or over, among whom records show that the number of cases is almost negligible. Such an estimate leads to the conclusion that at least two-thirds of the population of Los Angeles County over 10 should still be susceptible to measles, at least five-sixths to whooping cough, and at least seven-eighths to scarlet fever. It is incredible that such large proportions of susceptibles should really exist, at least in the case of measles, in view of the known instances where this disease has attacked nearly every member, old or young, of a community which it has invaded after being absent from it a generation or two.

A large number of unreported cases would help to explain this anomaly; but the Chief of the Bureau of Communicable Diseases of the Los Angeles County Health Department believes that reporting has been 90 per cent or better for measles, 95 per cent or better for scarlet fever, and is now 75 per cent or better for whooping cough, though it may have been as low as 50 per cent 10 years ago. At least three pertinent questions, therefore, are left unanswered: Have there been many "missed cases"—no diagnosis having been made? Has a considerable degree of immunity in people supposedly susceptible been developed as a result of exposures that did not lead to detectable symptoms? Do people in lands where the diseases are more or less endemic naturally become more nearly immune to measles, scarlet fever, and especially whooping cough, as they grow older?

Chart VII gives an idea of the varying life toll taken by the three diseases as they affected people of different ages. Measles has taken its largest

number of lives during the 2nd year of life, scarlet fever during the 4th, and whooping cough outstandingly so during the 1st. For children under 5, whooping cough has been by far the greatest killer of the three.

Chart VIII combines the factors of incidence and comparative danger to life, giving an idea of the chance children of different ages had of living or dying if attacked. Here, again, measles showed a peak during the 2nd year. It not only took a larger number of lives at that age, but killed a larger percentage of the children who had it. Scarlet fever, though more common in all later years up to 10, was more fatal in the 1st year. Whooping cough was extremely fatal during the first year of life. It ran about even with measles during the next 4 years. None of the three diseases was very serious in children over 10, but scarlet fever was considerably more so than either of the other two.

Textbook statements are in general agreement with what is shown by Charts VII and VIII.

CONCLUSION

It may be said that the records of measles, scarlet fever, and whooping cough during the past decade in the Los Angeles County Health Department area indicate that:

1. Climate and season have had considerable influence upon the incidence of the dis-

cases, and have tended to make the peaks of the epidemic waves come unusually late, especially for measles and whooping cough.

2. Exposure by personal contact may have played a greater rôle in the incidence of scarlet fever than textbook discussions would lead one to expect, and a lesser rôle in the incidence of whooping cough.

3. Case fatality rates for all three diseases have been very low. They are apparently not so great a menace to life in a subtropical area as they are in colder regions.

4. The streptococci causative of scarlet fever do not appear to be growing less virulent in the Los Angeles County Health Department area.

5. Natural susceptibility, decreasing with age, may have been an important factor in incidence, especially in the case of whooping cough.

6. Judging from the numbers of reported cases, an almost incredibly large proportion of the population over 10 years of age should still have been susceptible to measles, scarlet fever, or whooping cough. Why more people above 10 did not contract these diseases has not yet been clearly explained.

7. Below the age of 5, whooping cough was by far the greatest killer of the three; and above the age of 10, scarlet fever.

REFERENCES

1. Blackfan, K. D. *Cecil's Textbook of Medicine* Saunders, 1934, pp. 290-298.
2. Stevens, A. A. *The Practice of Medicine*. Saunders, 1933, p. 244.
3. Strong, R. A. *Tice's Practice of Medicine*. W. F. Prior Co., Inc., Vol. 3, pp. 279, 280.
4. Helmholtz, H. F. *Cecil's Textbook of Medicine*, 1934, p. 54 *et seq.*
5. Stevens, A. A. *The Practice of Medicine*, 1933, p. 274.
6. Levy, M. G. *Tice's Practice of Medicine*, Vol. 5, p. 463 *et seq.*
7. Holt, L. E., Jr. *Cecil's Textbook of Medicine*, 1934, pp. 307-310.

Experts Wrong and Genuine

THERE is always a certain attraction about the wrong kind of expert, about going to the man who knows nothing about it, because you are

afraid if you get a genuine expert his opinion would go against you, as indeed it very often would.—*Bernard Shaw.*

The Teaching of Epidemiology by Applicatory Problems

EDWARD L. MUNSON, M.D.

*Professor of Preventive Medicine, Medical School, University of California,
San Francisco, Calif.*

Brigadier General, Medical Department, United States Army, Retired

INSTRUCTION in the subject of applied epidemiology is obviously handicapped by certain inherent difficulties of presentation. While other branches of the medical curriculum may have their didactic teaching concretely demonstrated by laboratory procedure or illustrated in appropriate relation by clinical cases, the same is not true in respect to epidemiology. Epidemic outbreaks of communicable disease cannot be created for purposes of pedagogy; and where these have naturally occurred the conditions are habitually such that the resulting problems can scarcely be brought into the classroom for current solution.

Accordingly, much of the instruction in epidemiology is necessarily didactic and of a general nature; and the tendency is, in the formulation of test questions, to determine what amount of the information so given has been retained. This, so far as it goes, is of course desirable.

But for practical purposes it is quite as important to determine the ways and degrees in which the information so given is applied by the student—for after all the only real value of education lies in the practical use which is made of it. The whole purpose of instruction is to bring about prepared reactions to certain conditions liable to occur in the future. So far as epi-

demiology is concerned, such prepared reactions will rest on the known biological facts pertaining to the organisms concerned, and as affected by environmental conditions.

After the foundation of facts and methods has been didactically laid, any further development of epidemiology depends upon their practical application in the study and solution of problems. These problems may be hypothetical, or they may be cross-sections of some actual epidemiological occurrence. The former are demonstrably more adapted to teaching purposes. Past epidemics may be studied as abstract situations, but they lack the vivifying interest that attaches to the solution of a present emergency. Further, their actual conditions may not lend themselves to certain epidemiological features which it is desired to demonstrate. Finally, in such study, the tendency is merely to call attention to the channels of procedure which were actually employed, and particularly to those which led to a positive solution. Taught in this way, applied epidemiology requires nothing of the student in respect to the formulation by him of working hypotheses adapted to the specific conditions, and the pursuit of such hypotheses to their logical conclusion.

On the other hand, an artificially pre-

pared problem has no limitations which might interfere with the presentation of any phases which it may be desired to illustrate—just so that the situations assumed are logical and in accordance with accepted scientific facts. Such problems may be wholly synthetic, or they may be drawn up on the basis of an actual occurrence. However, there is no real teaching advantage in the latter, for a properly prepared hypothetical problem may be made equally realistic.

Problems may be classified as those which are static, usually representing a single situation intermediate in what has gone before and what is yet to come; and continuing problems, which comprise a series of coördinated situations, leading progressively to an ultimate conclusion.

A static problem must contain within itself appropriate factors and data to give a sufficient epidemiological picture, and is to be solved on the basis of an unchanging situation. It implies the selection of the single hypothesis best conforming to the announced data, and the formulation of a solution based thereon. Under such conditions, the factor of uncertainty as to procedure due to possible change in the situation is eliminated; and with the long time-factor usually allowed the student for solution, rapidity of thinking as well as selective use of the reasoning powers is ordinarily not a requirement. Such a restricted problem corresponds to the "map problem" which forms a part of the early training of army officers in the principles of tactics. In both instances such limited problems serve a very valuable purpose for elementary presentation—but they do not go far enough for the more advanced instruction.

The continuing problem is drawn so as to develop gradually through a series of progressive, correlated and logical phases. In it, the element of uncer-

tainty is present up to the final decision and action; the qualities of reason, evaluation, and deduction must be constantly in operation; and suitable procedures must be progressively outlined in the absence of any positive knowledge as to the changing situations which may develop. Such a continuing problem is like an army "war game," in which appropriate action must be taken with each shift of the controlling conditions.

By reason of his military training, the writer is necessarily conversant with the methods of preparation, conduction, and solution of army war games, and has adapted their principles to epidemiological problems. The results have been so practical and satisfactory, as shown by experience in this medical school, as to warrant their description to those who might be interested. Further, there seems reason to believe that the method may be useful in other branches of medical science having a changing picture, as in diagnosis, therapeutics, and prognosis.

In the Medical School of the University of California, the solution of such continuing epidemiological problems comes in the senior year, toward the end of the general course in preventive medicine, requiring the student to make specific application of the general principles already laid down. These problems greatly interest the class, and are probably the most popular exercises of the whole 3 year course. The gradual development of their solution has all the fascination of following through a mystery or detective story—and, in fact, the same general principles of logical sequence, relationship, evaluation, and inference are applicable in both instances. For the demonstration of such principles, one might even go so far as to recommend such stories as "The Adventures of Sherlock Holmes" as collateral reading in relation to applied epidemiology.

The preparation of an illustrative epidemiological problem is something of an art. The instructor, while restricted to scientific facts, must use a logical imagination in their selection and relation, and should endeavor to vivify and dramatize their presentation. The formulation of the problem depends, as to its character and phases, upon the requirements which it is desired to develop; and the nature and sequence of its successive situations are assumed and presented with that purpose in mind.

As with the writing of mystery stories, it is probably easier to decide first upon the climax and denouement, and write them out in the form of the solution contemplated. With this predetermined ending in mind, the instructor now works back and prepares as many antecedent and correlated situations as may be desired. Each such situation is so drawn as to bring out the points which it is desired to illustrate; and is followed either immediately or later by the correlated facts and the inference or conclusion based thereon. Finally, a preamble in the form of a "general situation" is drawn up as the basis of the problem, in such broad general terms as to permit of the various developments and changes which have been prepared to follow. The sample problem given herewith illustrates the possible diversity of presentation along the lines of development chosen; but it would have been equally possible to have changed its several sequent phases so as to make them demonstrate quite different situations, lines of procedure, and end-result.

For the development of such a continuing problem in the class-room a special procedure is essential.

1. It is presented to the class for solution as a series of coördinated situations, each of which is followed by an outline of its appropriate solution. This is done by the use of consecutive

lantern slides, each of which pertains exclusively to a special phase or situation.

2. The class, both individually and collectively, solves each of these situations as it is thrown on the screen. This is done by designating a student as principal to make the initial statement as to what should be done under the prescribed circumstances and another student as alternate to amplify or comment upon such initial statement. The class as a whole is then called upon for comment and criticism upon both statements.

At the expiration of the time-limit for the phase in question, its approved solution is then shown on the screen, and is open to general inquiry or comment by the class as a whole.

3. A time-factor governs the solution of the problem. For such a problem as is shown herewith, approximately 4 minutes is allowed for each separate phase. This 4 minute period is subdivided about as follows: 1 minute for general consideration, 1 minute for the answer by the principal, 1 minute for comment by the alternate, and 1 minute for discussion by the class. In practice, the general discussion usually figures out at more than 1 minute, as the principal and alternate do not ordinarily consume their full allotted time.

The imposition of a restricted time-factor has a very definite teaching value; not only moving the problem along steadily, but requiring the student to think rapidly as well as accurately. Experience shows that very satisfactory results are attained within the relatively brief period allowed for consideration.

4. Besides his answer, the student is expected to outline briefly the reasoning by which he reached his conclusion. This implies the enumeration as well as application of any facts considered as pertinent, and is a valuable training in

logical deduction. It also suggests points for consideration and discussion by the class.

The limitations of both lantern slide space and time-factor require succinct presentation of the basic ideas appropriate. The student must be brief and to the point, and generalizations and alternative procedures are not acceptable.

5. The instructor takes no part in the problem, other than to see that the time-factor is maintained, to raise inquiries as to deductions, and to answer briefly questions as to the approved solutions.

6. The method secures the mainte-

California city of about 25,000 population, and must do your epidemiological work yourself.

Disposal of excreta is by sewers; except in the suburbs, where a moderate number of privy vaults are in use. The water supply comes from a stream that is unsafe; but has an efficient chlorinating apparatus, which is checked by the laboratory every Tuesday and Friday. About two-thirds of the milk sold in the city is pasteurized. No typhoid case has been reported during the past 6 months.

First situation—December 1—
The following card has just been received by you:

REPORTABLE DISEASES

Anthrax	Bubonic Plague	Cholera	Coccidial Granuloma	Dysentery (Amoebic)	Epidemic Typhus	Erysipelas	Fungal Infections	Glanders	Granular Conjunctivitis	Measles	Mononucleosis	Paratyphoid Fever	Plague	Pneumonia (Lobar)	Rabies	Relapsing Fever	Scarlet Fever	Septic Bore Throat	Syphilis	Tetanus	Trichinosis	Tuberculosis	Typhoid Fever	Typhus	Whooping Cough	Yellow Fever
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REPORT OF A CASE OF COMMUNICABLE DISEASE

MAIL THIS CARD IMMEDIATELY. NO POSTAGE REQUIRED.

USE THIS SIDE TO REPORT ONE CASE ONLY.

Place and date -- City, Dec. 1, 193-

Disease Typhoid fever Onset About Nov. 27.

Name of patient John Smith Age 27

Address of patient 121 First Ave. Race White

School attended Employed at 211 Green St.

Probable source of infection unknown

Vaccination history:

If smallpox, when successfully vaccinated

If diphtheria, how many doses Toxin antitoxin Date

If typhoid, how many doses None When Where

Remarks: Agglutination positive. Large family in poor circumstances.

I first saw this patient at 4 P. M. o'clock on Nov. 29.

Signature of physician A. G. Goodman

Address of physician 44 Main St.

nance of the most intense attention and interest by every member of the class, for each is liable to be called upon for his own opinion at any stage of the problem.

The following problem, which is based on an actual epidemiological occurrence, is offered as an example of practical possibilities of such exercises.

EPIDEMIOLOGICAL PROBLEM—TYPHOID FEVER

General premises—
You are the Health Officer of a

What immediate steps by you are indicated?

- Answer to First Situation—
1. The case being a positive focus, it should be handled first.
 2. Remove and confine the infection by hospitalizing and quarantining John Smith.
 3. Destroy any potential intermediate foci by terminal disinfection of all objects liable to have been contaminated by the patient.

Second Situation—December 1—
John Smith has a wife and 4 children. None of them gives a history of previous typhoid.
What are you going to do about them?

Answer to Second Situation—

Start their immunization at once by a course of antityphoid inoculation.

Third Situation—December 1—

"Doctor," Mrs. Smith asks you, "how do you suppose John might have caught his typhoid?"

Answer to Third Situation—

"Well, Mrs. Smith," you reply, "nobody catches typhoid fever—he swallows it!"

"John could have been infected by direct contact with a case or carrier; or indirectly through contaminated water or food. Flies may carry the infection—but at this time of the year the flies could not be a factor in John's case."

Fourth Situation—December 1—

Diligent inquiry fails to reveal any probable local source of John's infection.

It develops, however, that on November 13 and 14 he was hunting at a ranch some 20 miles out of town, where the drinking water came from a shallow well.

What may you infer?

Answer to Fourth Situation—

You can make no definite inference.

Because of the wide limits of the incubation period of typhoid, it was possible for John to have acquired his infection either in his home town or at the ranch.

Fifth Situation—December 2—

James Jones has just been reported as a typhoid case, with onset about November 28.

It develops that he is a great friend of John Smith. They work at the same place; lunch together at Restaurant A; and were on the same hunting trip at the ranch.

What are now your inferences and actions?

Answer to Fifth Situation—

1. *Inferences* as to possible alternative sources of both infections remain unchanged.

2. *Actions—*

a. Telephone County Health Officer to ascertain antecedents of ranch as to typhoid fever.

b. Investigate conditions at place of work of Smith and Jones.

c. Investigate conditions at Restaurant A.

d. Determine source of milk supply of Restaurant A.

e. Check laboratory reports on local water supply.

vious typhoid at the ranch. Conditions at the Smith-Jones place of business seem satisfactory. Restaurant A reports a new cook hired on November 1, who admits typhoid a year ago. Its milk supply comes from Dairy B, and is not pasteurized. Laboratory reports of water analyses since September 1 show no positive *B. coli*.

What may now be potential sources and what will you do about them?

Answer to Sixth Situation—

1. The new cook in Restaurant A may be a possible carrier. He will be cultured, and ordered to stop work until laboratory results have been received.

2. The milk supply may be at fault. Conditions at Dairy B will be investigated.

3. The ranch well still remains a possibility.

4. No evidence incriminates the city water supply.

5. Flies can be definitely excluded from the problem.

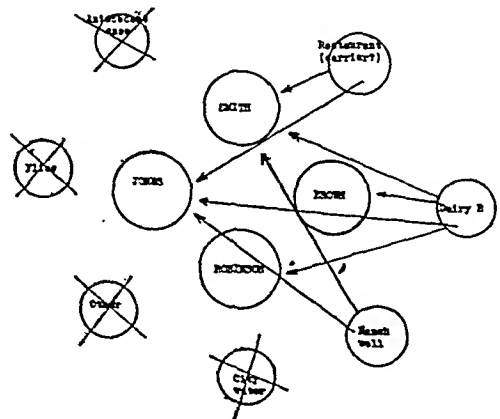
Seventh Situation—December 2—

Your representative who inspected Dairy B reports conditions as apparently satisfactory.

Reports have just come in of 2 new cases (Brown and Robinson) as having developed about November 29. Both used Dairy B milk. No other connection between them, or with the Smith and Jones cases, can be traced.

On the basis of information so far received, you roughly sketch out relationships as shown in Figure I.

FIGURE I

*Sixth Situation—December 2—*

The County Health Officer reports no pre-

What are your inferences and actions?

Answer to Seventh Situation—

1. The practically simultaneous occurrence in 4 users of milk from Dairy B is suggestive.

2. Prohibit sale of this milk until further notice, unless pasteurized.

3. Order the dairy operatives cultured, and warn them as to all necessary precautions.

4. Telephone all physicians that 4 typhoids have occurred, and to be on the look-out for others.

Eighth Situation—December 3—

Six new cases, widely scattered, are reported today, with onset as of about November 30. Only 2 of them have used milk from Dairy B. None of them—nor the Brown and Robinson cases—were out of town during November.

What may you now infer?

Answer to Eighth Situation—

1. Since only the Smith and Jones cases have been out of town during the incubation period, the last 8 cases must have a local source.

2. Dairy B milk remains under suspicion, for 6 of the 10 cases have used it.

3. Laboratory reports on cultures from the restaurant cook and dairy employees are awaited.

Ninth Situation—December 4—

Twelve new cases are reported today, as having developed about December 1. Only 1 of them used Dairy B milk. The laboratory reports that cultures from the cook at Restaurant A, and from the employees of Dairy B, are so far negative.

What are now your inferences?

Answer to Ninth Situation—

1. That the infection in over 90 per cent of cases must have been acquired locally.

2. That some other source than milk from Dairy B must be looked for.

3. That the possibility of a carrier in Restaurant A can presumably be eliminated.

Tenth Situation—December 5

Eighteen cases are today reported as having developed about December 2. Your chart of the course of the outbreak is shown in Figure II.

How will you interpret it?

Answer to Tenth Situation—

1. That the infection invaded about the middle of November.

2. That the invasion was abrupt, and probably from a single source.

3. That its concentration was probably considerable.

4. That there was some common vehicle of distribution.

5. That this vehicle had a more general and wider distribution than unpasteurized milk.

6. That the only other vehicle satisfying the requirements is the city water supply.

7. That the antecedents of this water should be rechecked.

Eleventh Situation—December 5—

You question the man at the water purification plant. "Tell me exactly," you demand, "what happened to your chlorinization apparatus about a fortnight ago!"

Under pressure, he admits: "Well, you see, Doctor, late on a Saturday afternoon—I think it was November 18—I found that the cylinders had run out of gas, and I couldn't get a new supply until Monday morning."

What are now your conclusions?

Answer to Eleventh Situation—

1. That raw water, known to be habitually unsafe, was distributed to the community for nearly 2 days.

2. That laboratory tests were too infrequent to discover it.

3. That so far as the epidemic is concerned, all other hypothetical sources can safely be disregarded.

Twelfth Situation—December 5—

What statement of public assurance are you now in position to make to the community?

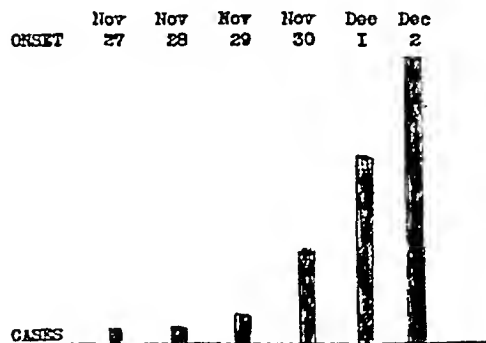
Answer to Twelfth Situation—

Your knowledge that the infection began on November 18, and continued for a couple of days, introduces a definite time-factor into your problem.

You are accordingly in position to say:

1. That the source of the typhoid outbreak has been determined.

FIGURE II



2. That it was an infected water supply, resulting from temporary lack of chlorinization.

3. That this water was shortly—and is now—again safe for use.

4. That the epidemic has now probably about reached its peak.

5. However, that cases in waning numbers, from the infection now incubating, may be expected to develop for about another week.

SOME EPIDEMIOLOGICAL AXIOMS

1. Hasty assumptions may give rise to erroneous conclusions.

2. The interpretation and evaluation of evidence may be more important than its temporary volume.

3. The *course* of an epidemic often suggests its probable *source*.

COMMENT

The foregoing problem was formulated with the purpose of bringing certain definite factors, which had been decided upon in advance, into logical interplay in relation to public health. Among these are the general sanitary conditions which might be expected in a small city; the use of the official notification card in reporting a case of typhoid fever; initial health requirements based on such report; immunization of close contacts; ways by which typhoid infection may be acquired; the incubation period, the time element, and the factor of season; various potential sources of infection, as case,

carrier, well or city water, restaurant, milk, flies; inquiries and inspections to be instituted, including laboratory investigations; the formulation of working hypotheses; effect of accruing evidence, both positive and negative, on the relative values of these hypotheses; appearance of further cases, and trend toward epidemic; inquiry with graph as to possible relationship between cases and potential sources; warning of the profession as to liability to outbreak; rapid development of epidemic conditions, with distribution of cases; discarding of hypotheses as they become untenable, and the strengthening of others; the sudden development of an epidemic; interpretation of its graph in respect to probable source; aid of statistical charts in epidemiological diagnosis; basic importance of verifying contributing data; the element of human frailty as possibly a determining factor in health problems; the need and nature of reassurance of the community; epidemiological axioms illustrated by the developmental procedure.

Analysis of the various situations of the foregoing problem shows that all these major factors in epidemiology, with others, are brought out and briefly demonstrated by them in appropriate sequence and ultimate logical perspective.

Eosin Methylene Blue Agar for Rapid Direct Count of *E. coli*

H. W. GEHM AND H. HEUKELEKIAN

*Department of Water and Sewage Research, New Jersey Agricultural
Experiment Station, New Brunswick, N. J.*

SCHULHOFF¹ working with *E. typhi* in sewage, perfected a method of obtaining excellent colony distribution of surface growth on brilliant green agar. We have applied this method to counting *E. coli* using eosin methylene blue agar as a medium.

Eosin methylene blue agar with and without crystal violet (1-100,000) were compared and it was found (Table I) that although the presence of crystal violet cut down the contaminants it also cut the colon numbers to an extent that would prohibit its use as a direct counting medium.

TABLE I

EFFECT OF CRYSTAL VIOLET ON THE RECOVERY
OF *E. COLI* FROM EOSIN METHYLENE
BLUE SMEAR PLATES

<i>E. coli</i> per c.c.		
<i>Media</i>	<i>Sewage</i>	<i>Pure Culture</i>
Eosin Methylene Blue	110,000	3,780,000
Eosin Methylene Blue + Crystal Violet (1:100,- 000)	51,000	1,810,000
Brilliant Green Bile Broth	95,000	3,500,000

METHOD

Eosin methylene blue agar is prepared according to the standard method except that the use of 2 per cent rather than the usual 1.5 per cent of agar gives a firmer surface for smearing. Plates are poured to a depth of about 3 mm. Too thin a layer leads to the drying out of media if left in the

incubator too long during drying process and spreading of the inoculum under the medium.

One c.c. of the inoculum is run on the surface of the medium and smeared with the pipette so that the entire surface is covered. The plate is then tilted back and forth several times, thus running inoculum over the surface and obtaining a more even distribution.

The plate is placed in a 37° C. incubator and the cover removed. Drying of the inoculum occurs in about 1 hour. To obtain perfect distribution it is necessary to tilt the plate, as done at start, when the plate is about half dry.

When the surface is thoroughly dry, the plate is closed, inverted, incubated 24 hours, and characteristic colonies are counted.²

Contamination from leaving the agar surface exposed in the incubator was practically nil in incubators which were not particularly clean. Only 2, small non-colon colonies were observed on the 50 control plates run. The dyes present in the medium evidently inhibit bacteria which may be deposited on the agar surface with the dust from the air.

Excellent distribution of colonies was obtained by this method. However, in most cases it was not advisable to count plates containing many more than 100 colonies, for when too heavy inoculum is used a growth is likely to occur be-

TABLE II

COMPARISON OF RECOVERY OF A PURE CULTURE OF *E. COLI* FROM PLAIN AGAR, BRILLIANT GREEN BILE BROTH AND EOSIN METHYLENE BLUE SMEAR AGAR

Test No.	E. coli Thousands per c.c.		
	Plain Agar Av. 3 Plates	Brilliant Green Bile Broth Av. 5 Tubes	Eosin Methylene Blue Agar Av. 3 Plates
1	4,600	3,500	3,700
2	174	150	163
3	306	250	288
4	121	100	109
Mean	1,300	1,000	1,063
Per Cent of Agar Count		77	82

tween the edge of the plate and the medium, causing a mass of gas bubbles and colonies difficult of differentiation. Plates containing between 30 and 100 *E. coli* colonies give the most consistent counts. An additional 24 hours' incubation gave no higher count and usually over-growth spoiled the plate.

DATA AND RESULTS

As we were interested in applying this method to sewage in various stages of treatment, and heavily polluted waters, comparative counts were made against the brilliant green bile broth count which has been found to be a very satisfactory counting method for *E. coli* due to the high percentage of confirmation obtainable. Its disadvantages are that 48 hours' incubation time is required and that the final results are only rough approximation of the number present. The variation may be wide on account of the significance given to one tube by the probability tables.

The first work done was with a pure *E. coli* suspension. Counts were made in brilliant green bile, plain agar, and on eosin methylene blue agar. Judging from Table II, eosin methylene blue agar is no more inhibitive than brilliant green and should provide a satisfactory counting medium for *E. coli*.

Table III gives the comparative counts on sewages by the eosin methylene blue smear plate method and brilliant green bile broth tube method on 19 different sewages from 8 plants. The results show a close agreement of the counts by the two methods. In

TABLE III

COMPARISON OF THE RECOVERY OF *E. COLI* FROM SEWAGES BY EOSIN METHYLENE BLUE SMEAR AGAR AND BRILLIANT GREEN BILE BROTH

Sewage Sample	Eosin Methylene Blue Agar Av. of 3 Plates	Brilliant Green Bile Broth Av. of 3 Tubes
	Thousands per c.c.	Thousands per c.c.
1	38	25
2	75	45
3	79	25
4	91	75
5	100	68
6	106	95
7	110	95
8	124	150
9	130	100
10	134	95
11	161	250
12	162	250
13	163	150
14	166	150
15	200	250
16	220	250
17	260	250
18	285	250
19	458	450
Average	168	165

13 cases out of 19 the counts by the eosin methylene blue agar method were higher than brilliant green broth bile.

TABLE IV

COMPARISON OF THE RECOVERY OF *E. COLI* FROM POLLUTED WATERS BY EOSIN METHYLENE BLUE AGAR AND BRILLIANT GREEN BILE BROTH

Sample	E. coli per c.c.	
	<i>Eosin Methylene Blue Agar</i>	<i>Brilliant Green Bile Broth</i>
	Av. of 3 Plates	Av. of 3 Tubes
1	330	150
2	1,800	900
3	2,300	2,500
4	3,300	4,500
5	5,300	2,500
6	7,700	4,500
7	530	450
Average	3,037	2,214

Table IV gives a comparison of the counts obtained by the 2 methods from polluted waters. Here the average by the eosin methylene blue agar is appreciably higher than by brilliant green

broth tube, and in 5 cases out of 7 the counts were higher by the former method than by the latter.

The method was compared with brilliant green bile broth in determining the *E. coli* removal of various treatment units in a sewage plant. The results in Table V show a close agreement by the two methods. In most cases the eosin methylene blue count was higher.

Table VI gives the results of a similar study from the different parts of an aeration tank of an activated sludge plant and of returned sludge. The agreements by the eosin methylene blue agar and brilliant green broth bile are again close.

CONCLUSION

The results so far obtained indicate that the eosin methylene blue smear plate method is satisfactory for direct rapid *E. coli* enumeration. The outstanding advantages are as follows:

1. Confirmed results in 24 hours
2. Less work involved

TABLE V

COMPARISON OF REMOVALS OF *E. COLI* BY THE DIFFERENT UNITS OF SEWAGE TREATMENT PLANT BY EOSIN METHYLENE BLUE AGAR AND BRILLIANT GREEN BILE BROTH

Media	E. coli per c.c.					
	Raw	After Settling	After Trickling Filter	After Secondary	After Chlori-	Stream Below
				Sedimentation	nation	
Eosin Methylene Blue Agar	207,000	137,000	3,800	10,000	330	12
Brilliant Green Bile Broth	172,000	147,000	2,500	7,000	250	9

TABLE VI

E. COLI BY THE EOSIN METHYLENE BLUE AGAR AND BRILLIANT GREEN BILE BROTH IN ACTIVATED SLUDGE

	Sample	E. coli per c.c.	
		<i>Eosin Methylene Blue Agar</i>	<i>Brilliant Green Broth Bile</i>
Aeration Tank Samples:	Inlet	26,000	25,000
	Center	7,000	6,000
	Outlet	3,300	3,500
Return Sludge:	Hillsdale	10,600	11,000
	Tenaflly	185,000	250,000
	Tenaflly	173,000	150,000

3. Less equipment required
4. Media cheaper and easier to prepare
5. Comparable counts are obtained with brilliant green broth bile.

This method has been found to be particularly adaptable to sewage plant control and sewage research. Application of this method to river waters not heavily polluted appears possible. In this work a comparison should be made with lactose broth with eosin methylene

blue confirmation to see if the inaccurate, cumbersome enrichment count may be omitted entirely.

REFERENCES

1. Heukelekian, H., and Schulhoff, H. Studies on the Survival of *B. Typhosus* in Surface Waters and Sewage. To be published in *New Jersey Agri. Exper. Sta. Bull.*
2. Levine, M. Bacteria Fermenting Lactose and Their Significance in Water Analysis. *Iowa State College Agr. Bull.* 62.
3. *Standard Methods of Water Analysis*. A.P.H.A., 7th ed., 1933.

N.T.A. Meeting in Saranac Lake, N. Y.

THE thirty-first annual meeting of the National Tuberculosis Association was held in Saranac Lake, N. Y., June 24-27, celebrating the fiftieth anniversary of the opening of the "Little Red" cottage, which is still preserved on the grounds of Trudeau Sanatorium. The modern treatment of tuberculosis in the United States was begun here by Dr. Edward Livingston Trudeau in 1885. The occasion provided a setting for a dedication of the cottage on the afternoon of June 25 with hundreds of delegates gathered on the lawn to witness the presentation of a bronze plaque by Dr. Kennon Dunham, President of the Association, to Dr. James Alexander Miller, President of the Board of Trustees of Trudeau Sanatorium. The ceremony was made more interesting by greetings from Mrs. Carolyn P. Lindsay, of Albany, N. Y., the oldest living patient to have occupied the cottage. She was under treatment there in 1887.

On the same afternoon the Canadian delegation laid a wreath at the foot of Trudeau's statue on the grounds of the institution. This well known statue, by Gutzon Borglum, pictures Trudeau sitting in his cure chair and gazing off at his beloved mountains.

The meeting opened Monday evening, June 24, in the large auditorium

of the High School. The formal program was followed by tableaux dealing with the life of Trudeau presented by pupils of the High School.

The registration totalled 1,365, which was a record breaker for size.

The sessions were well attended, beginning with preliminary meetings of the American Sanatorium Association and the National Conference of Tuberculosis Secretaries on June 24 and ending with a joint symposium of the pathological, clinical, sociological, and administrative sections of the N.T.A., occupying the entire day of June 27. The general title of the symposium was "Present Concepts of Tuberculosis Infection and Disease; their Principles and Application." The morning session dealt with the clinical and pathological considerations. The afternoon session discussed the question of how the present knowledge of tuberculosis may be applied in community programs in the next decade.

Dr. James J. Waring, of Denver, was elected President for 1935-1936. The 1936 meeting will be held in New Orleans, April 22-25.

A full report of the proceedings of the Saranac Lake meeting will be published later in the year in the *Transactions of the National Tuberculosis Association*.

Diseases of the Peasants of Haiti

CAMILLE LHÉRISSE, M.D.

Former President of the Medical Society of Haiti and Professor of Biology in the National Medical School of Port-au-Prince

AMONG the 2,000,000 country people included in our population, diseases may be found to vary remarkably from one part of the country to another. In addition to clothing, dwelling, and diet conditions, the environment and geographical location, plain or mountain land, constitute a factor exerting considerable influence on the sanitary status of the rural people. As local officials often fail to send reports of deaths to the vital statistics representatives, and in some areas it is not possible to require the presentation of death certificates before burial, the result is that no reliable death statistics are available for the Republic as a whole.

These conclusions are based on the investigations of the Payne Mission of the Rockefeller Foundation (1924-1925), in which the writer participated, in the examination of several thousand emigrants going from Port de Paix to Cuba (1924-1929), in a large number (700) of necropsies we performed in the General Hospital at Port-au-Prince from 1927 to 1929, in our experience in rural dispensaries, especially at Kenscoff (August-September, 1928), at Taifer (January, 1929), and at those opened at Morne La Selle, Marché Lamarque (Nouvelle Tourraine Section, Pétion-Ville District) and at Berly (Port-au-Prince District) (May-September, 1929). Such studies allow us to visualize some of the sanitary problems confronting the Republic of Haiti.

The diet of the Haitian peasants has

not improved since the slavery period. As a rule, quantity is preferred by them to quality. While it may be claimed this satisfies their stomach sometimes, one cannot say as much for their bodies. It will not be possible to remedy these defective hygienic conditions until the ignorance of the masses is fully conquered.

While farm work is not the cause of the prevailing industrial diseases, the long hours and the ensuing fatigue, especially in some regions, in women and children, not uncommonly bring about rather serious injuries. Weeding under the summer sun, the preparation of coffee for the market, and the threshing of corn, are hard tasks which almost invariably are accompanied by an acute morbid condition. This condition is characterized by febrile attacks, headache, articular pains, and often an inflammation localized in lumbar muscles, resembling quite closely the clinical picture of sciatica.

Our peasants are also quite liable to traumatic injuries including serious falls. Ploughing machines frequently cause wounds which, on becoming infected, develop into enormous ulcers complicated by tetanus. Children and women often have to carry over poor roads, especially in the mountain regions, huge loads of lumber, water, fruits, building materials, etc. This overwork must end inevitably by damaging their health. The flattening of cranial bones, the exaggerated bending of the spine, the injuries or prolapse

of internal organs, muscular tremors, headaches, cannot fail to produce most harmful effects on the skeletal frame (for instance, on the female pelvis), and must affect the individual's working capacity.

This carrying of heavy weights for long stretches by ill-nourished persons, enjoying only short rest periods, exerts an undue pressure on the posterior portion of the chest. This makes inspiratory dilatation more difficult, increases the tendency to pulmonary and heart infections, decreases blood oxygenation, and paves the way to a resistant chronic anemia.

In women miscarriage becomes rather common as a result of such overwork. Mothers do not remain long enough in bed after parturition, which many times occurs by the roadside. Very often one sees them up and about the day after labor. The puerperium, often very difficult and staged under most disastrous conditions, is in charge of midwives in the neighborhood. These facts explain the defective development of the new-born, their lessened resistance to disease, and the high infant mortality in country districts, which, according to Payne, is 67 per 1,000 in children from 1 to 4 years, and 167 per 1,000 among infants. The same conditions explain the prevalence of abdominal diseases in women.

In a general way, farming and long walks often compel women to stop nursing their babies. A most irrational and often inadequate feeding is then substituted, favoring digestive disturbances, nutritive diseases (Mann and Payne's *cdema* disease), and cachexia. These troubles will serve, then, as the starting point for serious dystrophies of a slow but fatal course. The very children of school age are employed at farming tasks and frequently kept at home for the most pressing work of the season.

With the exception of chronic neph-

ritis, the most common diseases among our peasants are of an infectious nature and preventable through social medicine and hygiene.

In our rural districts intestinal infections are common, especially among children, and for the most part take the form of dysenteries or enteritis. These dysenteries may be caused by bacilli (Flexner, Shiga), and in that case belong to the epidemic type, known in Haiti as "colerin," which affects yearly about 25 per cent of our rural population. Another type is caused by the *Endameba histolitica*, being rather prevalent in the north and affecting more or less, according to the region, from 10 to 20 per cent of our country people. Other organisms with a similar pathogenic rôle are a species of infusoria, the *Balantidium coli*, and intestinal worms.

The enteritis, less serious but just as prevalent, are caused by a species of monilia; by protozoa, *Giardia*, *Chilomastix*, *Trichomonas*; and by intestinal worms, such as *Necator americanus*, *Ascaris*, and *Strongyloides*. Their cause may also be a sudden chilling, poor food, and abuse of alcohol, and in children, ill advised nursing or premature weaning. In this special field there is much work to be performed by medical science endeavoring to teach mothers proper methods of child care.

Children sometimes are apt to eat dirt (geophagism). This habit, derived from the lack of certain dietetic elements, may be said to favor intestinal infestation through the swallowing of eggs or larvae of the worms from the ground. These intestinal parasites are very common and cause many diseases, especially among children. They are also a contributing factor in weakening adults. The most common are ascaris, oxyuris, trichuris, ankylostoma (*Necator americanus*), *Strongyloides* and taeniae. In 1925, among 4,439 persons examined in the Carrefour, Rivière

Froide, and Dégand districts, we found: in 30 per cent, ankylostomas; in 43 per cent, ascaris; and 58, trichuris.

Hookworm disease is common in the sugar cane, coffee, and other plantations. The proportion of infested persons in the mass of Haitian people examined so far is 26 per cent. The prevalence and seriousness of the infestation vary a great deal in the different places. The Cul-de-Sac plain is free from the disease because the larvae of the *Necator americanus* do not develop in salty ground, but all our mountain districts are infested. This condition has been well known in Haiti since the colonial period under the name of "stomach trouble." The persons most in danger of contracting it are those in direct contact with the hot and damp larvae-infested ground, such as cane, banana, cocoa, coffee, tobacco, and rice plantations. Levacher, in his "Guide Médical des Antilles" published in 1847, states that "its appearance may be due to the clearing of virgin lands, to the opening of ditches . . . and to a watery and vegetable feeding." The slaves became infested by dirt eating, and killed themselves by the slow torture of hookworm disease. "I have seen negroes," Levacher states, "to poison themselves in this way, compelling their children to follow their example, purely to revenge themselves and with the sole purpose of hurting their owners' interests by getting out of condition."

Since that time the significance of hookworm disease has remained ignored in Haiti, and only after the first efforts made by the Rockefeller Mission (1924) to penetrate our country districts, and the opening of the first country dispensaries, was it that the Public Health Service began its campaign against one of the causes undermining our national energy. In order that this campaign might secure its best results it should be completed with a

series of sanitary measures. It is not enough to advise wearing of shoes, since the larvae scattered on the ground by fecal matter may occasionally infect even well-shod people. The menace involved in hookworm disease will decrease only when general conditions are improved and preventive medicine makes further progress.

New growths of all kinds are common in Haiti. Uterine fibroids reach sometimes considerable size. Lipomas and keloids are not uncommon. Cancer is just as prevalent as non-malignant growths but seldom diagnosed. Malignant tumors cause an approximate death rate of 5 per cent in the hospitals of the country. From a study by R. M. Choisser, it may be seen that among 700 necropsies he found 27 malignant cases, that is, 3.8 per cent (3 sarcomas and 24 carcinomas). In a series of 486 biopsies from different groups, 75 (15.4 per cent) were malignant growths, namely: 32 adenocarcinomas, 24 squamous cell carcinomas, 5 basal cell carcinomas, 3 pigmented melanomas, 3 non-pigmented melanomas, 2 lymphoblastomas, and 6 fibrosarcomas. This shows that cancer is just as prevalent as in other countries, even in the temperate zone.

Goiter is common in our mountain districts. Pellagra is occasionally found but it is not very prevalent. Granular conjunctivitis affected, according to Dr. James Hooker, 16 per cent of the children examined during the investigation carried out by the Rockefeller Foundation. Chickenpox, influenza, and cerebrospinal meningitis caused, in 1929, many deaths throughout the republic, but especially in the north.

A condition rather common in the Cul-de-Sac plain, in the Despuiseau region, is gusarola (pinta. carate), characterized by patches assuming different colors. As it also happens with other dermatomycoses, lack of cleanliness contributes to its development.

The course of the disease is very slow. Uncovered parts of the body are the first to be attacked. The white and violet varieties are those most prevalent. Several varieties may be seen in the same individual, and the patient's appearance in such cases is very peculiar and most striking. The infection is accompanied by a very annoying itching. Its etiology has not been definitely determined. While some writers believe the pathogenic agent is a fungus, this of late has been questioned (cf. *Bol. Of. San. Pan.*, May, 1934, p. 458).

Tuberculosis is rather common in our country districts. While not strictly a tropical disease, it progresses very rapidly in our country, recalling the childhood type tuberculosis of the temperate zone. The spread of this disease in our rural districts may be explained by the absence of a specific immunity in the people, which makes them more sensitive to the infection. Promiscuousness is another factor playing an important rôle in the tuberculization of the people. In the hospitals of Haiti tuberculosis is the most important cause of death, *amounting to 30 per cent of the total number of deaths!*

If we recall that a sample of milk from the Taifer section (Port-au-Prince district) contained 1,600,000 bacteria per c.c., when at the most there should have been only 10,000, and none of them of a pathogenic type; that watering the milk is an everyday affair in our rural districts; that even spring water is at times polluted by all sorts of excreta; it is easy to understand why typhoid fever claims numerous victims, especially in the colder regions, in spite of the immunity derived from repeated mild infections. This disease often exhibits an atypical course and is generally complicated by malaria. Paratyphoid fevers are also quite common.

Malaria has been known in Haiti since the discovery of the island.

Robertson and Abbé Raynal have left us interesting descriptions. Columbus, during his second trip, contracted a violent fever which left him in a comatose condition (a typical manifestation of malignant tertian due to *Plasmodium falciparum*). This is what French physicians of the colonial era called intermittent cerebral pernicious fever. Tertian and double tertian fevers, even now called acclimatization fevers, were very common during the colonial period.

Among 4,439 persons examined in different places during the surveys of the Rockefeller Mission, 67 per cent showed malarial parasites in the blood. Wilson and Clark, while examining at Port de Paix 11,000 emigrants coming from different districts in the north and northeast on their way to Cuba to work for the United Fruit Company, found that 23.5 per cent had malaria. In Haiti two species of anopheles have been identified as malarial carriers: *albimanus* and *grahamii*.

Filariasis is found mostly in the Cul-de-Sac plain and in the Quartier-Morin region. As is the case with all parasitic diseases, it may be present in apparently well people without exciting any complaint. As a rule, however, it produces repeatedly more or less serious lymphatic disturbances and many times it is the cause of elephantiasis. The filarial vector in Haiti is the *Culex quinquefasciatus*.

A disease which has become a menace among us is leprosy. This condition seems all the more serious since, in spite of the marked improvement secured almost universally through modern therapeutics, there is no leprosarium in Haiti and many cases remain untreated, and at large.

The most common disease in our country districts is yaws. Among 2,564 persons examined in different districts in the neighborhood of Port-au-Prince the Rockefeller Mission found 78 per

cent affected with yaws. The disease is common among the young. Among 3,289 cases examined by Dr. Wilson, Dr. Mathis, and the writer while the traveling clinic stayed at Nouvelle Touraine, Marché Lamarque and Berly in 1929, 61.1 per cent were children under 10. The disease made its appearance in Haiti with the introduction of the first African slaves in 1509 (cf. Sydenham: "Opera Medica," Vol. 2, p. 33, 1850 edition, and Levacher, *supra*, p. 280), but it is only since 1922 that a rational and intensive treatment has been introduced in our rural districts. The first description of this disease is accurately given by Oviedo y Valdés in 1526 in his "Historia general y natural de las Indias," where he calls it a terrible pustular disease. About 235 years ago, Father Labat wrote in his "Travels to the Islands of America": "The Caribs are very sensitive to yaws. This disease is proper of America and natural there. All those born there, of either sex, are attacked, perhaps since they come into this world, even when their parents are quite healthy or anyhow they seem to be so."

The Haitian Government has already spent enormous amounts in combating this disease. Public education and intensive treatment in some districts have been successful in reducing the number of patients. In the Jacmel region alone, from May, 1925, to April, 1926, 167,267 cases of yaws were treated. In 1926, over 200,000 injections of arsenicals against the disease were given throughout the Republic. During the fiscal year 1928-1929, 190,000 injections were given, and from 1918 to 1931 the injections given by the Public Health Service make a total of 2,655,386. At present the campaign against yaws continues in the rural dispensaries with the routine use of stovarsol or spirocid in tablet form. These drugs were put in use when the traveling

clinics were opened in May, 1929, substituting the other arsenical preparations and bismuth. From 1929 to 1930 over 300,000 tablets were given.

The wonderful central plain, known by Moreau de Saint-Méry under the name of Guaba plain, represents approximately one-tenth of the total surface of the Republic of Haiti. While fruitful and well irrigated, its population sees its earning capacity curtailed by the morbid triad of malaria, hookworm disease, and yaws. The importance, from a sanitary standpoint, of the new hospital at Hinche in this region may be understood when one remembers that this central plain must become some day the granary of the Republic.

The Public Health Service, organized in 1919, has come to remedy a sad condition and has not stopped for one day in offering to the peasants, in the shape of object-lessons and demonstrations, practical hygienic information, at every place where a permanent group of people, as a market or a chapel, may be found. It has also organized dispensaries throughout the Republic to extend its beneficial influence. However, there is still much to be done.

The Public Health Service is carrying out slowly and methodically, a hard civilizing task, the medical education of the masses, thereby leading them further and further from the old empirical beliefs.

BIBLIOGRAPHY

Brau, Paul. *Trois Siècles de Médecine Coloniale Française*, 1931.

Butler, C. S. The Medical Needs of the Republic of Haiti at the present time. *U. S. Nav. M. Bull.*, 24, 2, 1926.

Butler, C. S., and Peterson, E. La Tréponématose et l'Hygiène Publique. Traduction: Camille Lhérisson. *Presse Méd.*, 60 (July 27), 1927.

Butler, C. S. De la Tréponématose, *Ann. de dermat. et syph.*, Traduction: Camille Lhérisson. VII Série, tome 11, 11 (Nov.), 1931.

Choisser, R. M. Pathology in the Tropics. *U. S. Nav. M. Bull.*, 27, 3-4:55, 1929.

Clark, H. C. Spleen and Parasite Rates as Measures of Malaria in the Caribbean Area. United Fruit Co., 16 *Ann. Rep.*, 1927.

De Saint-Méry, Moreau. *Description topographique, physique, civile, politique et historique de la partie française de St. Dominique*. Philadelphia, 1797.

- Fox, Howard. *J. Trop. Med.*, XXXIII:76, 1930.
- Labat, Jean-Baptiste. *Nouveau voyage aux Iles de l'Amerique*, 3rd ed., 1742.
- Lhérisson, C. *Problèmes de Pathologie Régionale* (Communication faite à la Société de Médecine d'Haiti, 1932).
- Levacher, M. G. *Guide Médical des Antilles*, Paris, 1847.
- Mann, W. L., Hehn, J. B., and Brown, C. J. An Edema Disease in Haiti. *J.A.M.A.*, Nov., 1920.
- Maun, W. L. Further Remarks upon an Edema Disease in Haiti. *Mil. Surgeon*, 55:297, 1924.
- Melborn, K. C. Haiti's Greatest Public Health Problem. *U. S. Nav. M. Bull.*, XXVIII, 2 (Apr.), 1930.
- Oviedo y Valdés, G. *Lo Historia General de los Indias*, 1526.
- Parsons, R. P. *History of Haitian Medicine*. Paul B. Hoeber, New York, 1930.
- Payne, G. C. *Survey of Haiti (1924-25) with Entomological Report by William H. Hoffman*, Rockefeller Foundation.
- Pressoir, C. *Lo Médecine en Haiti*, 1 Vol., 1927.
- Wilson, P. W., and Mathis, M. Observations on the Epidemiology and Pathology of Yaws. *J.A.M.A.*, 74:1289-1292 (Apr. 26), 1930.
- Wilson, P. W. Report of Malaria and Microfilaria Survey of 11,000 Laborers in Haiti and 2,007 Children. *U. S. Nov. M. Bull.*, 27:87, 1929.
- Wickersham, W. W. Edema Disease among Haitian Prisoners. *U. S. Nov. M. Bull.*, 27, 69, 1929.
- Directeur Général du Service National d'Hygiène Publique: *Rapports Annuels* (Années 1925-26, 1926-27, 1927-28, 1928-29, 1929-30, 1930-31, 1931-32).

ACKNOWLEDGMENT—The writer is infinitely grateful to Captain C. S. Butler for his criticism and helpful advice regarding this communication.

Fireworks Study

A NATION-WIDE study of the nature, causes, and results of fireworks accidents was inaugurated July 5 by the American Museum of Safety with the coöperation of public health authorities and safety organizations throughout the country.

The study will seek to ascertain how serious a hazard to life, limb, and sight fireworks are, which particular items of fireworks are involved in most accidents, what influence, if any, prohibitory legislation has on the frequency of fireworks accidents, and the sources of the fireworks causing accidents. The study will be under the direction of Dr. Leland E. Cofer, former Director of Industrial Hygiene for the State of New York, and former Assist-

ant Surgeon General of the U. S. Public Health Service. Dr. Cofer will be assisted by representatives of national agencies all of whom have had acquaintance with the problem of fireworks accidents and who now constitute the Fireworks Accident Prevention Committee of the American Museum of Safety.

The leading fireworks manufacturers, through Pyrotechnic Industries, Inc., have not only made an unconditional grant to the Museum of Safety which will make possible a wholly objective study, but have agreed in advance to take steps for the elimination of those elements in fireworks manufacture which are shown to be responsible for serious hazards to life and limb.

Sewage Contaminated Irrigation Water

A Major Public Health Program in the West*

EDWARD N. CHAPMAN, M.D.

Colorado Springs, Colo.

ONE of the marks of civilization is the proper disposal of human excreta. It is human excreta which carry the germs of infectious intestinal diseases, which we may well call the filth diseases because they are transmitted through human filth. They include typhoid fever, amebic and bacillary dysentery, and so-called "infectious diarrhea." Where they are present one will find conditions permitting the contamination of water, milk or other food with urine and intestinal contents. Where this contamination does not occur this group of diseases does not have to be seriously reckoned with.

What is sewage? I am amazed to find how many people think of it in terms of dishwater and storm sewers. In reality sewage contains: urine, sputum, feces, disintegrated toilet paper, disintegrated sanitary pads, and contraceptive devices. Look at your sewer outlets if you live in a town not equipped with a treatment system and convince yourself of these facts.

When sewage comes in direct contact with food or domestic water we have epidemics of intestinal disease. Chicago has furnished us with two graphic illustrations of this within the recent past. A group of experts commissioned to investigate the recent amebic dysentery epidemic there re-

ported¹ that it was not caused by food handlers, as was suspected at first, but rather from the bursting of sewage pipes in the cellar of one of the leading hotels. The contents flooded the kitchen, food and refrigeration compartments of this hotel. Plumbing cross-connections, which never should have been permitted by health authorities, carried the ameba to a neighboring hotel. Even this short exposure to germ laden sewage was enough to start an epidemic the last of which has not been heard.

The second instance was during the stockyards fire in May, 1934. Sewage contaminated water was used for fighting the fire and for drinking purposes by some of the firemen and spectators. There followed among these, 69 cases of typhoid fever, 2 of paratyphoid, and many of acute diarrhea. Laboratory studies revealed that a high percentage had become infected with *Endameba histolytica*.²

Can danger to the public health result from pouring untreated sewage into streams used for irrigation? and, if there is danger in this procedure, how much does it amount to? The answer is an important one particularly to the inhabitants of our arid western states where irrigation is essential to the raising of all market produce.

Lest, in the light of present knowledge, in posing this question, I seem to set up a straw man merely to knock him down, let me state that many of

* Presented at the General Session of the Annual Meeting of the Arizona Public Health Association, Phoenix, Ariz., April 23, 1935.

our cities and towns in the West dump their sewage untreated into nearby streams—streams used in many instances almost immediately to irrigate market produce. In less populated districts, where sewerage systems are infrequent, privies will be found located directly over irrigation ditches in order that the output may be carried away easily to some neighbor's field. Man, like his mother, Nature, acts generally along lines of least resistance. These methods of disposal have aroused only rare objections and then, as a rule, from some farmer who has found the odor more than he can bear. Farmers as a class have made no complaint for they have wanted the water content of the sewage added to their scanty sources of supply and also, frequently, they receive a continuous source of fertilizer—human excreta—without cost. They have failed to realize that the buffalo gnats, which pester and sometimes kill their cattle, breed in quantities as a direct result of stream pollution. A leading newspaper with a large circulation in the West, located in one of our large cities the sewage of which is disposed of under these conditions, recently told its readers in glaring headlines that a sewage disposal plant was a waste of money and editorially advised its readers to vote against any such unnecessary expenditure. This problem then is not one made of straw, but is very real and vital.

Our methods of pouring untreated sewage into small streams and rivers carry the germs of disease and often the solid constituents of sewage into irrigation ditches to deposit them on the hands of the workers, on the soil of the fields, and on the vegetables growing in these fields. Examine some of these ditches and fields, especially those below our larger cities not equipped with adequate disposal plants. The sight is nauseating. That the grossest kind of pollution is possible under this system

is shown by the fact that lettuce has been served in public eating places with feces adhering to the leaves.

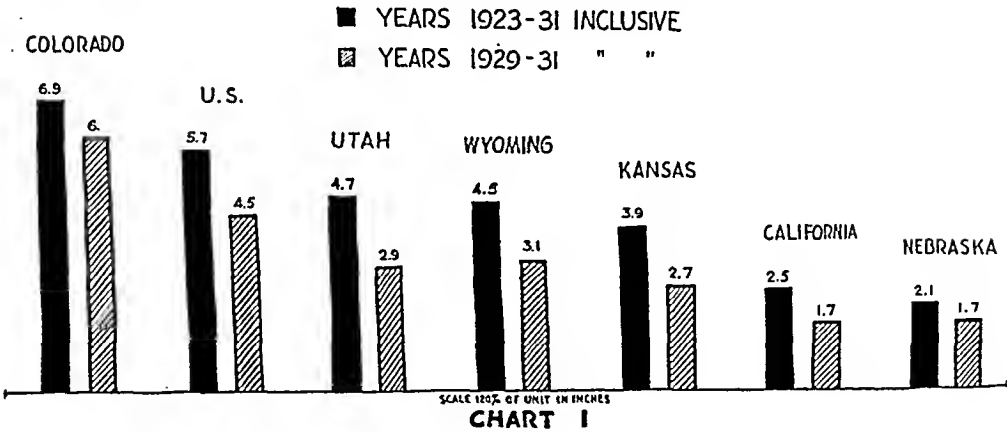
Analysis of vegetables raised with sewage contaminated irrigation water has been made in the bacteriological laboratory of the Colorado State Board of Health.³ Even vegetables which are grown many miles below the source of pollution were found to reek with colon bacilli, and after thorough washing the colon bacillus index in many instances was too high to pass them as fit for human consumption. Mills, Bartlett, and Kessel⁴ have shown that pathogenic bacteria may persist on the surface of fruits and vegetables kept under moist conditions for 15 days or more. If these bacteria gain entrance through injured or decayed portions they may remain alive 7 to 42 days. These are the vegetables that come into our markets, are handled by our housewives, and eaten by our people.

Is it possible that I am unduly exercised over the unesthetic side of this picture? Even though the chance for infection exists, may we not be fortunate enough to escape infection? Is there any real evidence to show that, after all, people living in regions where these methods of disposal are the rule have more than their share of the filth diseases?

Colorado offers an excellent laboratory for study because this is a state in which there is extensive irrigation, some of it done with water grossly contaminated by sewage and some of it with water which is relatively clean. Let us look at the death rates from some of the intestinal diseases for this state and compare them with those of the United States, the neighboring states, and California, which has a larger percentage of Mexicans and foreign born than Colorado. These figures are based on the latest statistics of the U. S. Public Health Service, and cover as long a period as is on record for

TYPHOID FEVER

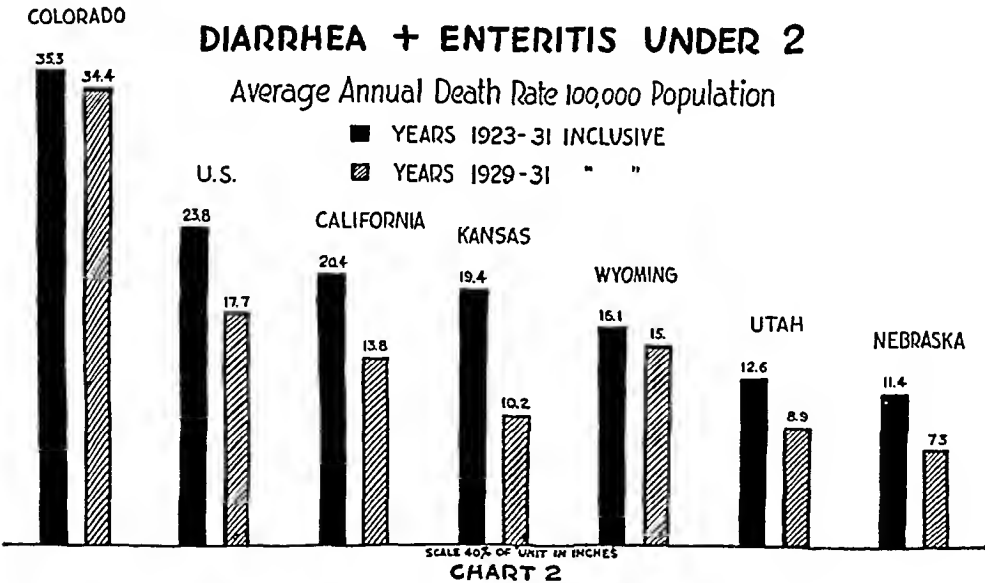
Average Annual Death Rate per 100,000 Population



this group of states as a whole. California is included because this state also has extensive areas under irrigation; but the use of contaminated water for the raising of market produce is not permitted.⁵ Nebraska and Wyoming have no counties where sewage contaminated water is used.⁶ Utah and Kansas each have 1 county using contaminated water for irrigation.⁷ I was unable to get comparable data for Arizona and New Mexico which have been in the U. S. Registration Area too short a time. Such figures as I was

able to obtain would make one suspect that they are faced to even a greater extent with the same problem that exists in Colorado.

Charts I and II illustrate these comparisons. The death rates from diarrhea are especially high among babies and young children. Infants are most susceptible to contaminated food and this death rate is always a very delicate indicator of contamination. Not only are our death rates high in Colorado, when compared with those of the United States, our neighbors,



and California, but we have failed to show the percentage decline which they have shown in recent years.

Something is evidently wrong. It is not the general level of the intelligence of the population. Colorado, in a study⁸ based on 7 different tests, was rated among the first 10 states in this country in the matter of intelligence of its people. It has not as large a percentage of Mexican or foreign born population as has California, yet California has a much lower death rate from these filth diseases.

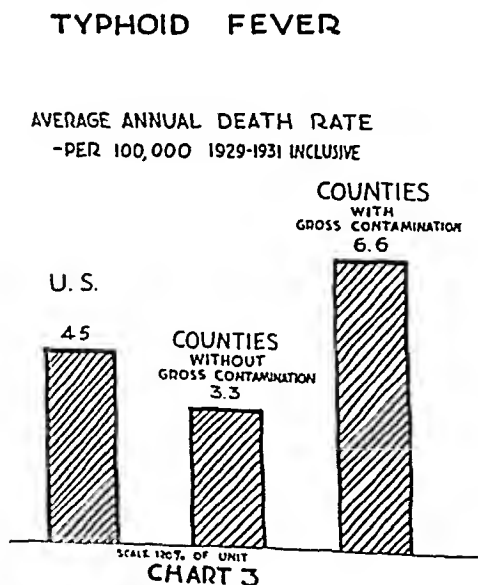
Fortunately for the purpose of our analysis, though not for economical administration, Colorado is divided into 63 small counties. Using figures for the total number of deaths from typhoid fever and from "diarrhea and enteritis under age 2," I have calculated the death rates for each of the counties and averaged them for the 3 year period 1929-1931, the latest that can be compared with the group of states already illustrated. These figures appear on Maps I and II. Counties are black which had an average death rate for this period higher than the average for the United States. Black dots mark the location of the principal

towns and cities in the state which pour their sewage untreated into streams, the water from which is used for irrigation. Without knowledge of my results, B. V. Howe, Colorado State Sanitary Engineer, indicated the streams in the state which he regarded as grossly contaminated with sewage and these I have included.

The maps graphically illustrate that, with very few exceptions, the high death rates from typhoid fever and diarrhea and enteritis under 2—some of them almost 10 times the average for the United States as a whole—occur in counties where irrigation water is grossly contaminated by sewage. Counties, whose irrigation water is relatively clean or where there is no irrigation, have, with very few exceptions, low death rates. Many of them have had no deaths from these diseases during the 3 year period. Deaths from dysentery and from "diarrhea and enteritis over age 2," in general follow this same distribution.*

Not only are death rates from the filth diseases high in most of these counties where raw sewage is mixed with irrigation water, but also every summer and fall, about the time most of the local grown vegetables come upon the market in all of these areas for which we have data, there is an epidemic of diarrhea. These epidemics used to be frequent in eastern cities. Correspondence with boards of health of some of these cities reveals the fact that they are now largely unpleasant memories of the past, thanks to improved methods of sanitation.

Granted that these diseases are problems only where sewage is spread over the landscape as we do through



* Sagauche County, which gives the appearance of being an exception to the rule, has much irrigation. The water table is unique in this county as it is only 2-3 feet below the surface of the ground. This permits contamination of domestic water supplies from privies—the common method of disposal in this county. Privies are also located directly over irrigation ditches in some instances.

MAP I—TYPHOID FEVER



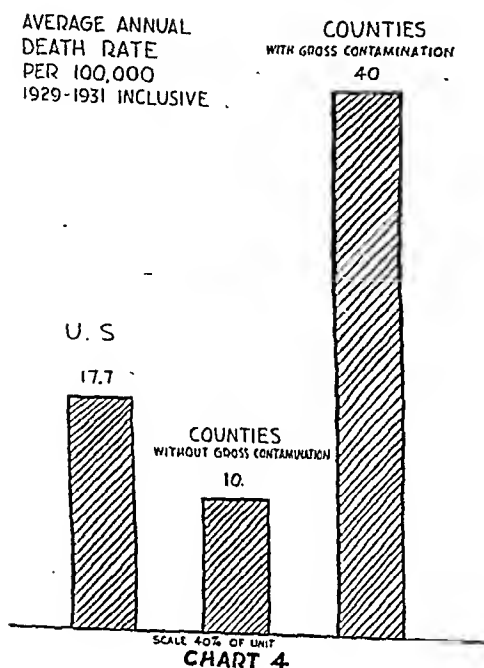
MAP II—DIARRHEA + ENTERITIS UNDER 2 YEARS



● RAW SEWAGE
DUMPED

THE STREAM GROSSLY CONTAMINATED BY SEWAGE
COUNTIES WITH RATE ABOVE U.S. AVERAGE IN BLACK

DIARRHEA + ENTERITIS UNDER 2



the medium of irrigation water, still can we be sure that we have found the cause of our trouble? Cannot a poor domestic water supply furnish the explanation for this unfortunate condition? A recent survey⁹ of the domestic water supplies in Colorado by the U. S. Public Health Service gives the state a reasonably good bill of health. In general the supplies of the large cities are well protected, yet most of these large cities with good water supplies have a high incidence of intestinal disease. Hence domestic water transmission is not the answer.

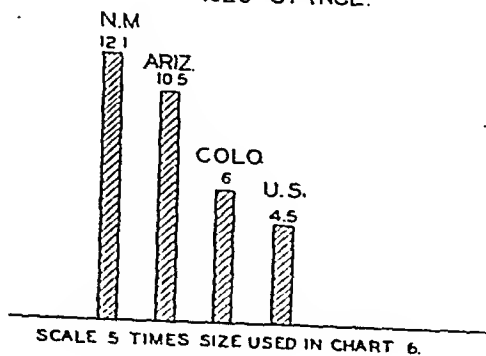
What about milk? This same report of the U. S. Public Health Service showed that there is only a 64 per cent compliance by milk producers as a class with regulations recognized as necessary for the marketing of wholesome milk. Dairies are poorly screened. Pasteurization is often improperly performed. This situation, however, is, with a few notable exceptions, a uniform condition throughout the state, and if it alone furnishes the

explanation for our high death rates, we should expect that most of our county rates would be high. This is not what we find, as the maps indicate. Poorly safeguarded milk in the sewage contaminated counties can be particularly dangerous. Cows frequently wade in polluted water, contaminating their udders and thus the milk. Occasionally farmers use irrigation water for washing utensils. Flies can breed in deposits in irrigation ditches and then fly into unscreened dairies to transmit intestinal bacteria to milk.

What foods raised with sewage contaminated water should be avoided? Fruits, such as strawberries, which grow close to the ground; vegetables eaten raw, such as lettuce, cabbage, celery, green onions, carrots, radishes, and parsley. We have seen already that thorough washing cannot be depended upon to make them fit to eat. Cooking will destroy intestinal disease producing bacteria, but the handling by the housewife of the vegetables preparatory to cooking, or their presence in the refrigerator, may furnish an opportunity to transmit these bacteria to other foods. This is especially dangerous when articles of food intended for infant consumption are contaminated. It is as though the head of cabbage,

TYPHOID FEVER

AVERAGE ANNUAL
DEATH RATE PER 100,000
1929-31 INCL.



for instance, were covered with black sticky tar. It cannot be handled without transferring the tar to the hands and to everything later touched, which may include the baby's mouth, his toys, or his food.

All this sounds almost unbelievable in a civilized community, yet it does exist, not only in Colorado, but in other states in the arid region of our South and West where irrigation is necessary. It is the sort of thing that one finds in a more aggravated form in China, where intestinal disease is rampant and American tourists are warned to avoid all green vegetables. In certain European countries human fertilizer is used on gardens, but only after proper curing, thus killing disease producing organisms. Ordinary animal fertilizers do not carry the germs of human intestinal disease.

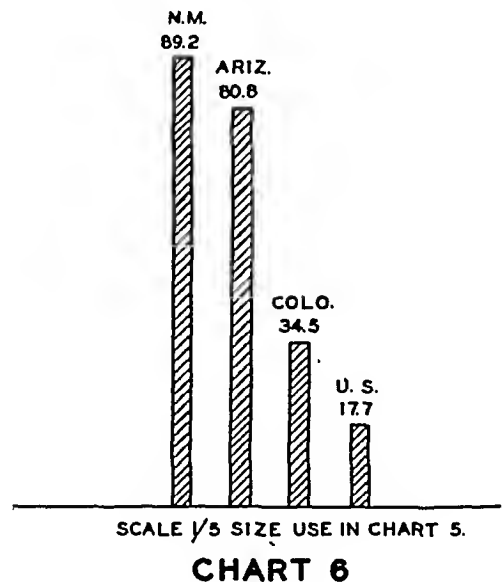
This condition among us has persisted because the majority of thinking people, the sort of people who are sensitive to matters of hygiene, have not realized that it existed. I am convinced that all that is necessary to end this repellent situation is to inform the people of the facts. This is being done in Colorado under the active leadership of the Committee on Public Health of the Colorado State Medical Society and the Colorado State Board of Health. Boulder has just completed a sewage disposal plant. Denver, Colorado Springs, and Greeley, within the past month, have voted bonds for this purpose. With these progressive communities leading the way it will not take long for other cities without proper sewage disposal to fall in line.

The government has shown that it is ready to assist financially with grants under the P.W.A. in the improvement of sanitation throughout the country. Cities in many eastern and Pacific coast states are building sewage treatment plants to protect streams and rivers which are used only for naviga-

tion, bathing, and fishing. How much more important it is that we should protect our streams from sewage pollution. Irrigation water does not need to have the purity of domestic water unless it is used for domestic purposes, but it must be protected against gross contamination. The California regulations, too lengthy to discuss in this paper, seem sane and practical. Remember, however, that regulations are worthless unless the people want them enforced.

The solution is one of education. We, in this dry section of the United States, where irrigation is necessary, must separate our food from our feces, if we are to rid ourselves of our high

DIARRHEA + ENTERITIS
UNDER 2
AVERAGE ANNUAL DEATH RATE
PER 100,000
1929-31 INCL.



incidence of the filth diseases. It is the duty of all who are leaders in public health in the West to investigate this problem as it applies to their own states, and then to carry to the people the facts. Our people, once informed,

can be depended upon to take the steps necessary to end this dangerous and revolting condition.

REFERENCES

1. Amebiasis Outbreak in Chicago. Report of a Special Committee. *J.A.M.A.*, 102:5 (Feb. 3), 1934.
2. Hardy and Spector. The Occurrence of Infestations with *E. Histolytica* Associated with Water-Borne Epidemic Diseases. *Pub. Health Rep.* 50, 10:325-334 (Mar. 8), 1935.
3. State of Colorado, Division of Public Health, *The Denver Sewage Problem, A Sanitary Survey*. pp. 6-7.
4. Mills, Bartlett, and Kessel. The Penetration of Fruits and Vegetables by Bacteria and other Particulate Matter. *Am. J. Hyg.*, V, 5:559-79 (Sept.), 1925.

5. Personal Communication from State Board of Health of California.
6. Personal Communication from State Boards of Health of Nebraska and Wyoming.
7. Personal Communication from State Boards of Health of Utah and Kansas.
8. *New York Times*, May 13, 1933, p. 1.
9. Waller, C. E. *Supplement 101, Pub. Health Rep.*

ACKNOWLEDGMENTS—The author is indebted to Drs. C. H. Boissevain and C. T. Ryder, of Colorado Springs, for checking his bacteriological data; to Alfred Cowles, III, and W. F. C. Nelson, of Colorado Springs for assistance with regard to statistics presented, and to Dr. H. M. Bracken, Claremont, Calif., for helpful criticism.

Aerial Navigation

ON June 5, 1935, the United States Senate ratified, with two reservations, the International Sanitary Convention for Aerial Navigation, which was opened for signature at The Hague, on April 12, 1933, and signed on behalf of the United States on April 6, 1934.

Two reservations were made: 1. Exempting the United States from liability to amendments unless they were first accepted by the government; 2. reserving the right to decide as to whether or not a foreign district is infected and also what requirements shall be applied.

"The ratification will have to be deposited with the Government of the

Netherlands before the convention is proclaimed by the President. The convention provides that as soon as 10 ratifications have been deposited, the Government of the Netherlands will draw up a procesverbal and transmit copies to the Governments of the high contracting parties and to the Office International d'hygiene publique, and the convention shall come into force on the 120th day after the date of the procesverbal. Ten ratifications have already been deposited with the Netherlands Government, and the convention will come into effect on August 1, 1935." —*Pub. Health Rep.*, June 28, 1935, pp. 863-864.

Outbreak of Food Poisoning, Probably Due to *Staphylococcus Aureus*

A. CORPENING AND ELSIE P. FOXHALL

Bureau of Laboratories, State Department of Health, Richmond, Va.

TWELVE people were involved in a food poisoning outbreak following a dinner at which cake with custard filling was served. A local physician made a study of conditions and found that only the people who ate the cake became ill. The State Epidemiologist inspected the kitchen where the dinner was prepared and found it clean and sanitary. The pantries and refrigerators were also remarkably clean. The cooks and helpers were well and gave no history of having been ill during the previous month.

Two cakes with a custard filling were made Friday morning, September 7, one of which was served for luncheon on Friday, but no one became ill following this luncheon. The other cake was placed in the refrigerator that afternoon. Saturday morning it was taken out of the refrigerator and left at room temperature until it was served that night, September 8, for dinner.

The people who ate the cake that evening became ill within 3 or 4 hours after eating. Nausea, vomiting, griping abdominal pain, diarrhea, and prostration were the outstanding symptoms. One patient had, in addition, some disturbance of vision and violent cramps in his leg muscles. It was necessary to administer morphine to quiet him. The illness persisted in some cases 3 or 4 days. No deaths occurred.

A portion of the cake and custard filling was sent to the laboratory 3 days

after it was made. Since the cake also contained the custard filling, we will refer only to the cake. A direct microscopical examination showed the presence of staphylococci and large Gram-positive spore forming bacilli. Some of the cake was emulsified in sterile saline and inoculated on dextrose agar and eosin methylene blue agar plates; also in 1 per cent dextrose broth, veal infusion and beef infusion broth.

Animal experiments were made with portions of the cake. No ill effects were produced in rabbits or guinea pigs following the intraperitoneal injection and feeding of portions of this cake.

The bacteriological examination of the cake showed 4 types of organisms: *Bacillus subtilis*, *Streptococcus fecalis*, *Staphylococcus aureus* and a Gram-negative bacillus belonging to the Eberthella group and corresponding to *Eberthella enterica* (Bergey's classification). Three of these organisms, *Streptococcus fecalis*, *Staphylococcus aureus* and *Eberthella enterica* were tested for toxin production. *Bacillus subtilis* was not included, as we know of no instance in which *Bacillus subtilis* has produced food poisoning. For toxin determination a medium similar to the custard filling was prepared and divided into three 2 oz. portions. One portion was inoculated with 1 c.c. of a broth culture of the *Staphylococcus aureus*, another portion with 1 c.c. of a broth culture of the *Streptococcus fecalis* and the

third portion with 1 c.c. of a broth culture of the *Eberthella enterica*. The portions were fed to cats after 48 hours of incubation at 37° C. Each cat consumed approximately 1½ oz. of custard. There were no noticeable effects. Three 1 oz. portions of minced beef, to which was added 1 c.c. of a 48 hour broth culture of each organism, were fed to cats. There was no evidence of illness. A 24 hour culture of the organisms inoculated into beef infusion broth was fed to cats. The cat fed the *Eberthella enterica* culture did not show any evidence of illness; the one fed the *Streptococcus fecalis* developed diarrhea within 5 hours; the one fed *Staphylococcus aureus* appeared to be nauseated within 6 hours, but did not vomit. The cats were kept under observation 4 days,—all remained alive and were well at the end of this time.

Further studies for determining the toxin production of the organisms were conducted with rabbits and mice. Forty-eight hour bacterial-free broth filtrates of each organism were inoculated intraperitoneally into mice, but caused no evidence of illness. A rabbit inoculated intravenously with 1.5 c.c. of a 48 hour bacterial-free broth filtrate of *Eberthella enterica* died 1¼ hours later. A second rabbit inoculated intravenously with 1.5 c.c. of a bacterial-free filtrate of a 48 hour broth culture of *Eberthella enterica* developed a slight diarrhea within 1 hour. Two rabbits inoculated intravenously with

1.5 c.c. of a bacterial-free filtrate of a 48 hour broth culture of *Streptococcus fecalis* and *Staphylococcus aureus* did not show any evidence of illness. One and five-tenths c.c. of a bacterial-free filtrate of a 96 hour broth culture of *Staphylococcus aureus* and *Eberthella enterica* injected intravenously into rabbits failed to produce illness. Two c.c. of a bacterial-free filtrate of the 3 organisms grown in custard for 48 hours and inoculated intravenously into rabbits did not produce any symptoms of illness.

Further experiments were conducted with human volunteers. The results are shown in Chart I.

Blood was received from one person who had been made sick by eating the cake. A culture made from this blood showed *Staphylococcus aureus*. The culture was made from a clot and there is a question as to the etiological significance of the presence of *Staphylococcus aureus*, since a large number of blood cultures sent to the laboratory show the presence of this organism. The organism isolated from the blood did not agglutinate the patient's serum.

Specimens of feces were received from 5 persons who became ill after eating the cake. *Staphylococcus aureus*, *Streptococcus fecalis* and *Proteus vulgaris* were isolated. The incidence of these organisms in the specimens was no more than would be expected from any fecal specimens.

The *Staphylococcus* isolated from the

CHART I

RESULTS OF INGESTION OF BACTERIAL-FREE FILTRATES BY HUMAN VOLUNTEERS

Human Volunteer	Type Filtrate	Organism	Amount	Results
A	48 hr. broth	<i>Eberthella enterica</i>	5 c.c.	No ill effects
B	48 hr. broth	<i>Staphylococcus aureus</i>	5 c.c.	No ill effects
C	96 hr. broth	<i>Eberthella enterica</i>	20 c.c.	No ill effects
D	96 hr. broth	<i>Staphylococcus aureus</i>	20 c.c.	Nausea, vomiting, diarrhea
E	96 hr. broth	<i>Streptococcus fecalis</i>	20 c.c.	No ill effects
F	48 hr. custard	<i>Eberthella enterica</i>	6 c.c.	No ill effects
G	48 hr. custard	<i>Staphylococcus aureus</i>	7 c.c.	Nausea, diarrhea

Control tests were made with normal filtrates in each instance.

food produced a yellow pigment. The morphology was that of a typical coccus, occurring singly, in pairs, and in clumps. Dextrose, lactose, maltose, mannite, and sucrose produced acid but no gas. Salicin and inulin were not affected. Gelatin was not liquefied. Litmus milk was rendered acid, but coagulation did not occur. A 96 hour beef infusion broth culture heated to 100° C. for 15 minutes, only partially destroyed the toxic substance. A human volunteer swallowed 20 c.c. of a bacterial-free filtrate of a broth culture exposed to heat at 100° C. for 15 minutes, and while the reaction was not violent there was a slight indication of nausea and soreness of the abdomen, with occasional griping pains. This was the same person as volunteer "D" who had previously ingested 20 c.c. of a bacterial-free broth filtrate that had not been exposed to heat.

As the symptoms developed within 3 to 4 hours after ingestion of the cake it seems probable that a formed toxic substance was the active agent. The *Staphylococcus aureus* isolated

from the cake apparently produced a toxic substance in broth and in custard media as shown by the effect of the sterile filtrates, which, when swallowed by human volunteers, gave rise to symptoms resembling those of the persons made ill after eating the cake.

SUMMARY

1. Food poisoning due to cake with custard filling caused the illness of 12 persons.
2. This illness was acute gastroenteritis with nausea, vomiting, diarrhea and prostration. In the more acute cases there were severe muscular spasms. No deaths occurred.
3. Microscopic examinations of the food showed *Staphylococcus aureus* to be the predominating organism.
4. Specimens of the cake were fed to rabbits, guinea pigs, mice, and cats. There were no severe illnesses.
5. Bacteriological examination of the cake revealed 4 types of organisms: *Staphylococcus aureus*, *Streptococcus fecalis*, *Eberthella enterica* and *Bacillus subtilis*.
6. Human volunteers developed symptoms of food poisoning after drinking the *Staphylococcus aureus* filtrates. Filtrates from the *Eberthella enterica* and *Streptococcus fecalis* did not prove to be toxic when swallowed by human volunteers.

Development of Adult Type Pulmonary Tuberculosis Following the Recognition of a Childhood Form

H. R. EDWARDS, M.D.

Acting Health Officer, New Haven, Conn.

HOW frequently will an individual with a childhood type tuberculosis progress to an adult pulmonary form? This question is of considerable importance in tuberculosis administrative practice. If this progression occurs in over 2 per cent of cases, is it logical to provide the necessary facilities for adequate supervision? If such supervision is deemed necessary, then it is logical that we should make every effort to discover all cases of childhood type tuberculosis for further observation. The facilities necessary to establish and maintain the above indicated services are costly, and before adopting them we should know the approximate return to be expected from the dollar invested.

Available data in the literature on this problem is limited and not fully comparable. In New Haven, we have observed 155 children originally classified as childhood type tuberculosis—9, or 5.8 per cent of whom later developed an adult pulmonary form. We present our material with the hope that similar data may be forthcoming from other workers to assist in determining the relative importance of this control procedure with the many others more or less well established.

It has been shown by Opie¹ that on autopsy, every case of adult form pulmonary tuberculosis has an associated primary lesion. Also, it is assumed that

the presence of a childhood type lesion represents much more than casual infection. Thus, the inference adduced is that every case with evidence of a childhood type lesion is a potential case of adult form.

Pope² in reporting on 5,000 children followed in the Chadwick clinics, states:

During the period of observation, 30 new cases of pulmonary tuberculosis developed. . . . In this group the average age at which pulmonary tuberculosis was diagnosed was 15.4 years, and the mean interval from the original examination to the development of pulmonary lesions was 4 years. The proportion of cases in which pulmonary tuberculosis developed was twice as high among children with childhood type lesions as in the suspect group, 0.93 compared with 0.46 per cent. . . . Of the whole observation group during a mean period of about 3½ years, pulmonary tuberculosis developed in 0.6 per cent while the mean incidence of pulmonary disease in the total school population has been 0.1 per cent.

Hall and Chang³ reporting on 1,007 Chinese of the professional class, indicate that in 308 cases, there were changes in diagnosis over a period of supervision. Of 144 originally classified as tracheobronchial tuberculous lymphadenitis, 6, or 4.1 per cent, developed manifest pulmonary tuberculosis in an average of 54.5 months.

Korns⁴ reports that, in a group of 100 positive tuberculin children show-

ing X-ray evidence of childhood type, 2 later developed an adult type, or 2 per cent. One of these cases had remained in the home with his father who had had a positive sputum for years. The second had had a heavy childhood exposure in the home 7 years previously, but none since that time.

Rathburn⁵ states:

This type (childhood tuberculosis) is found in only between 3 and 4 per cent of the total school population of our county, which means that 50 per cent of the cases of pulmonary tuberculosis developing during the 'teens, is confined to this small group.

Stewart⁶ reports that 84 out of 10,000 children examined at Lymanhurst, 0.08 per cent had pulmonary tuberculosis. Thirty-six of the 84; 43 per cent or 0.04 per cent of the 10,000, were observed to have progressed from a childhood type to adult form. He concludes that primary tuberculosis infections do not prevent consumption from developing at some later date, and in fact predispose to consumption if successfully reinfected from exogenous or endogenous sources.

In New Haven, there have been two reports indicating the progression from a childhood type to a pulmonary form. Boles⁷ tabulated data on 127 cases previously diagnosed as childhood type in the files of the New Haven dispensary, over the period 1916 to 1929. The ages on admission were 1 to 15 years, and at the close of the period of observation, 6 to 28 years, in 1931. Fourteen, or 11 per cent, developed an adult pulmonary lesion. Contact history was definite in 11, questionable in 2, and negative in 1. Edwards⁸ in a partial analysis of tuberculosis dispensary practice among New Haven residents in 1931, revealed 105 changes in diagnosis among 2,693 examined. There were 3 originally diagnosed as childhood type who later developed a pulmonary lesion, or 0.9 per cent.

The tuberculosis program in New

Haven is based on the family unit. For purposes of continued study and analysis, every case of diagnosed tuberculosis (all forms) is carried in our files until he dies, moves away, or is lost. For similar purposes of study, we endeavor to carry every tuberculin positive child, and every childhood type disease discovered in the clinic, until the individual attains the age of 25 years.

A review has been made of the current tuberculosis family roster in New Haven, March, 1934, to determine the number of instances in which there was a progression from childhood types to an adult type. We located 155 individuals with a primary diagnosis of childhood type tuberculosis, which came within the following general classification:

1. The diagnosis of childhood type was made prior to 1932.
2. Age of individual when first diagnosed childhood type was under 18 years.
3. A definite history of tuberculosis had been made in one or more members of the family.
4. Roentgenographic evidence of a childhood type lesion.

There were 9 of the above individuals who progressed to a pulmonary tuberculosis, which was confirmed by subsequent radiographic examination.

It is of interest to consider further some of the factors involved in the 9 cases in which progression of disease was noted.

FACTORS INVOLVED IN 9 CASES

Exposure to Tuberculosis—In each of the 9 families, there were one or more primary cases of pulmonary tuberculosis. In 6 families, there was 1 case, in 2 there were 2 cases, and in 1 family, 3 cases. In addition, 1 family had also a case of tuberculous meningitis. Each of these diagnoses was made prior to the diagnosis of childhood type in the individual in this study. The tuberculous meningitis and 3 of the pulmonary diagnoses were made at

the time of death. Our records do not give reliable information as to the probable duration of illness before the date of death.

An attempt was made to estimate the exposure in days from the date of first diagnosis of the primary case to its termination in the home, either by death or removal to a sanatorium. Allowance was made for periods of hospitalization of the primary case. Three of the cases had some hospital care, but finally died in the home. There were a total of 1,942 days of exposure for the group. In 3 cases, the time ranged from 2 to 17 days, and in 4, from 509 to 686—thus an average of 242.7 days for each case.

It must be obvious that the actual period of exposure was much longer than from the time of diagnosis of the primary case, and would easily range from a few months to years, if we knew exactly the time of onset of disease in the original cases.

In each of 5 families, the primary case of tuberculosis was removed by death, varying from 2 to 10 years before the case under discussion was diagnosed as childhood type. The progression to adult form occurred without other known sources of infection in these families. In 4 families, the primary case of tuberculosis was living at the time. A childhood diagnosis was made, and in 3 at the date the adult pulmonary type was made. In 1 of the latter families, the primary case is in a sanatorium where he was admitted shortly after diagnosis.

Bacilli in Sputa of Primary Cases—In the known primary sources in the 7 families in which a diagnosis was made before death, there were 9 cases known to have had bacilli in their sputum. The pulmonary cases diagnosed at time of death undoubtedly were likewise infectious.

Hospitalization of Primary Cases—All of the primary sources in the 9

families, excepting 3, had some period of hospitalization during the period of exposure.

Deaths Among Primary Cases—Of the 13 sources of primary infection, all but 1 had died at the time this study was made. The 1 case still living has been in a sanatorium since diagnosis. Practically all of the adults have been examined one or more times during the period of supervision. There are a few children in 2 families younger than the case included in this study, that have not as yet been examined. The oldest is 10 years, and the others average under 5 years. All unexamined individuals, adults, or children, are, according to all available information from our nursing service, in good health, and would not be considered as possible sources of reinfection.

Analysis of Cases Showing Progression of Disease—Sex—There were 7 females and 2 males.

Age at Time of Diagnosis—A diagnosis of childhood type was made at an average age of 12 years, the youngest 7 and the oldest 18 years.

A diagnosis of adult pulmonary forms was made at an average age of 15.1 years. The average days between the childhood type and adult pulmonary form was for the 9 cases, 993 days, or 2 years, 8 months, and 23 days.

Bacilli in Sputa—Only 2 of the 9 cases have shown bacilli in their sputa to our knowledge.

Hospitalization—Five of the 9 cases have had some period of hospitalization during the period of supervision.

Deaths—One child who progressed to an adult form has since died of tuberculosis.

DISCUSSION

A review of the findings of certain investigators dealing with the observed progression of childhood type tuberculosis to an adult pulmonary form indicates a wide variation from 0.04

per cent by Stewart to 4.1 per cent by Hall and Chang, the latter dealing with an older age group than the former. The reports from New Haven studies vary widely from 0.9 per cent to 11 per cent. The most recent analysis of New Haven data reported herewith as 5.8 per cent differs from Boles's report chiefly in that it is confined to New Haven residents, whereas the latter covered many patients registered at the New Haven Dispensary from many adjoining communities. The only apparent reason for this variation is that Boles's cases were possibly exposed to greater infection risks than those individuals studied as New Haven residents. Since 1927, New Haven authorities have placed considerable emphasis on hospitalization of the open case; in fact, no case of open tuberculosis, once discovered, need remain in the home. In 1928, about $1\frac{1}{2}$ patients were hospitalized at all times per each annual death. By 1934, this ratio had been raised to $2\frac{1}{2}$ patients. It is known that many of the smaller communities near New Haven, and utilizing the New Haven Dispensary services, have not been favored with similar hospital facilities. The possibility of casual infection in any of these cases must be considered, though we have no knowledge of its occurrence.

In view of the fact that none of the above reported results are entirely comparable, and, further, that the percentage of progressions vary so widely, it does not seem that we have as yet reached a point where we can with any degree of surety state the administra-

tive importance or significance of the childhood type lesion.

It is important that more extensive data be collected on this problem, as it is one of fundamental importance in tuberculosis administration. If it is found that much less than 1 per cent of cases will show progression, it would not seem justifiable to set in motion extensive case-finding facilities with the costs involved to discover lesions of primary infection. If, on the other hand, the most recent experience reported herewith for New Haven is a reasonably accurate average, then we should include in our tuberculosis program the necessary machinery to detect early lesions and the necessary supervision through the danger period.

It is of some interest to note that practically all cases observed by others and referred to in this report, as well as our own, occurred among the adolescent age group.

REFERENCES

1. Opie, Eugene L. Pathological evidence of first infection in association with active pulmonary tuberculosis. *Am. Rev. Tuberc.*, 10, 3 (Nov.), 1924.
2. Pope, Alton S. The Discovery and Prevention of Tuberculosis in the Community. *J.A.M.A.*, 97, 12 (Sept. 19), 1931.
3. Hall, G. A. M., and Chang, C. P. Latent Pulmonary tuberculosis infections in Chinese adults of the Professional Classes. *Am. Rev. Tuberc.* 30, 2 (Aug.), 1934.
4. Korns, John H. Practical administrative policies for supervision of childhood type tuberculosis. *Milbank Memorial Fund Quart.*, 22, 3 (July), 1934.
5. Rathburn, W. L. Tuberculosis Among High School Students. *J. Outdoor Life*, 24:9-12 (Jan.), 1927.
6. Stewart, Chester A. Does a primary tuberculosis infection afford adequate protection against consumption? *J.A.M.A.*, 100, 14 (Apr. 8), 1933.
7. Boles, Arthur R. A study in the progression of childhood type tuberculosis. Thesis presented 1930-1931 in partial fulfillment for the degree of M.D., Yale Medical School.
8. Edwards, H. R. The Tuberculosis program in New Haven. *Am. Rev. Tuberc.*, 21, 2 (Feb.), 1930.

Bacteria on Fresh Fruit

MARION M. JOHNSTON, PH.D., AND MILDRED J. KAAKE

*Research Laboratories of the Department of Paediatrics, University of Toronto,
and the Hospital for Sick Children, Toronto, Ont.*

MICROÖRGANISMS held to be responsible for infections have been isolated from fruits, such as dates and melons.^{1, 2, 3} The present report is concerned with an attempt to isolate from fresh fruits bacteria similar to the causative species which have been cultured from cases of infectious diarrhea (summer diarrhea, or gastro-enteritis) admitted to the Hospital for Sick Children, Toronto.^{4, 5}

It has been shown that flies have probably served as vectors of these colon-typhoid-dysentery species.⁵ The prevalence of flies prior to and during the seasonal period when these cases are epidemic suggested that the above mentioned bacteria might be conveyed by these insects to fruit which is abundant in the stalls during the same chronological period. The fact that such fruit is also handled by the vendor offered the possibility of contamination directly from human sources.

During August and September, 1933, 8 lots of fruit were purchased from stores located at different points in the city. This fruit was displayed for sale either inside or outside the front of the shop where it was quite accessible to insects. The vendor transferred the purchases — apples, pears, plums, peaches, crab-apples, grapes, and tomatoes—to paper bags in which they were taken directly to the laboratory. With sterile forceps, these fruits were transferred to sterile beakers in which they were washed with sterile normal

saline buffered with sodium and potassium phosphates to pH 7.0. The saline was then centrifuged and part of the sediment was spread upon Mac-Conkey bile salt lactose agar and upon blood agar plates. Sterile broth was added to the remaining sediment which was then incubated over night, after which a loop of culture was spread upon similar plates. After incubation, a large selection of colonies which presented differences in appearance were transferred to agar slopes and an attempt made to identify them culturally. The color, shape, and texture of the cultures were noted. Films from each culture were stained by Gram's method. The following tests were carried out: (1) motility, using an 18 hour peptone water culture; (2) indol, using the Ehrlich reagent after at least 5 days' incubation; (3) methyl red and Voges-Proskauer using the colon bacilli isolated; (4) Koser's citrate test; (5) gas production in dextrose peptone water only. Lead acetate, litmus milk and gelatine medium were also used. The production of acid was shown in peptone water medium containing Andrade's indicator and, separately, 1 per cent of the following alcohols or carbohydrates: lactose, dextrose, maltose, saccharose, xylose, mannite, arabinose, salicin, and raffinose.

Identification of the various species enumerated was accomplished by descriptions compiled from various sources.⁶⁻¹⁰

The following species were identified:

Micrococcus pereitrens 2 cultures

Mic. candidus 1

Staph. pharyngis 6

Staph. tetragenus 1

Staph. subflavus 6

Staph. epidermidis 3

Staph. aurantiaeus 1

Staph. citreus 2

Sarcina lutea 1

Protens mirabilis 1

Alcaligenes marshalii 31

Al. bookeri 10

Al. albus 6

Al. fecalis 10

Aerobacter aerogenes 39

Aer. levans 2

Aer. cloacae 9

B. coli communis 12

B. coli communior 1

B. oxytocus perniciosus 1

B. alkalescens 3

B. dispar 1

B. dysenteriae Sonne (?) 3

The following species grew in Koser's citrate medium: *Mic. candidus*, *Prot. mirabilis*; *Al. marshalii*, *Al. bookeri*; *Al. fecalis*; the aerobacter species; *B. coli communis* and *communior*; *B. alkalescens* and *B. dispar*.

The remaining species failed to grow with the exception of *Staph. citreus* and the *B. dysenteriae* Sonne (?) which were not tested.

Staphylococci were found on fruit from each source, and hemolysis was demonstrated by a strain of *S. aureus* isolated from one lot. *B. subtilis* which was always hemolytic was present in the cultures from all sources. Hemolysis was shown by *A. marshalii* and *A. fecalis*. In addition to the various species of *Alcaligenes* noted, 4 unidentified cultures presumed to belong to that genus were recovered. In regard to the strains which gave the cultural reactions of *B. dysenteriae* Sonne, no agglutination was obtained when they were tested with pure R and S agglutinating sera. A strain of *B. fluorescens* and 3 yeasts were isolated. Fifty cultures of unclassified proteolytic bacilli, 8 unclassified Gram-positive cocci and 33

other unidentified cultures, mainly Gram-negative bacilli, were found.

DISCUSSION

The majority of the species of bacteria identified in this study were probably of soil origin and therefore were of little significance as probable causative factors in human disease. However one strain of *B. dispar* was isolated which is held to be the cause of dysentery in man.¹¹ Three strains of *B. alkalescens* which are not considered pathogenic⁸ were obtained. The presence of members of the colon group may indicate pollution from fecal sources. *B. oxytocus perniciosus* has been isolated from soil and from the alimentary tract of humans.⁷

Gray¹² reported that *B. aerogenes* was practically universally present although in small numbers in stools of normal adult humans, but its preponderance in numbers in water over that of *B. coli* may indicate long past fecal contamination, and, as far as water is concerned, may be taken as indicating freedom on the part of the water from pathogenic microorganisms including *B. typhosus* and *B. paratyphosus* Beta.

The strains of *B. coli communis* and *B. coli communior* which were MR + and VP — grew in the citrate medium which is not in agreement with the classification of the majority of fecal colon strains according to Koser's work.¹³ They may therefore be assigned to an intermediate group which, although at times found in feces, are not normally inhabitants of the intestinal canal.⁸ Bardsley¹⁴ found:

. . . that organisms of the coliform group are not widely distributed in nature except where fecal contamination has taken place at some period more or less remote. . . . that the occurrence of *Aer. aerogenes* and the intermediate type in food supplies may be due to fecal pollution although the presence of these bacteria in the absence of *B. coli* would seem to suggest that the pollution had not been recent.

If fecal pollution of fruits by flies or human hands does occur the bacteria transferred thereto do not remain viable for a very long period. In order to test this point the following experiment was carried out:

A tomato and 2 apples placed in a sterile covered beaker were sprayed with a saline suspension of *B. dysenteriae* Sonne, and then allowed to stand at room temperature for 32 days. At intervals a sterile swab moistened with sterile broth was rubbed over the surface of the fruit and then rubbed over sterile MacConkey lactose bile salt agar. The species was obtained from the surface of the tomato up to the end of 2 days but not after 6 days; it survived for 10 but not for 18 days in the flesh of the tomato, a fissure having developed which permitted internal contamination. It was obtained for 6 but not for 8 days from the skin of an apple.

SUMMARY AND CONCLUSION

1. A study of the bacteria on the skins of fresh fruit yielded in addition to staphylococci, proteolytic and alcaligenes bacilli, 1 strain of *B. dispar*, and 3 of *B. alkalescens*.

Thirty-nine strains of *B. aerogenes*, 12 of *B. coli communis*, 1 of *B. coli communior* and 1 of *B. oxytocus perniciosus* were cultured. The coli communis and coli communior strains appeared to be of the intermediate type.

2. The presence of these species on fruit may suggest pollution from fecal sources.

3. *B. dysenteriae* Sonne persisted on the surface of tomato for at least 48 hours, and for 10 days in the tomato tissue. It was not cultured after 8 days from the skin of an apple.

A study of bacteria isolated from fresh fruit has been carried out. The presence of members of the colon and dysentery groups of Gram-negative bacilli suggests possible fecal contamination. However, no widely accepted pathogens of the colon-typhoid-dysentery group held responsible for severe summer diarrheas in infants and children were obtained.

REFERENCES

1. Hunwicke and Grinling. *Lancet* 214:1071, 1928.
2. Hoder. *Deutsche med. Wchnschr.* 54:1806, 1928.
3. Mackie and Trasler. *Indian M. Gaz.* 57:121, 1922.
4. Johnston, Brown, Tisdall, and Fraser. *Am. J. Dis. Child.* 45:1, 1933.
5. Johnston, Brown and Kaake. *Ibid.* 45:1, 1933.
6. *Bergey's Manual of Determinative Bacteriology* (4th ed.), 1934.
7. Weldin's Classification. *Iowa State College J. Sci.* 1:121, 1927.
8. Topley and Wilson. *Principles of Bacteriology and Immunology*, 1932.
9. Castellani and Chalmers. *Manual of Tropical Medicine*, 1919.
10. Medical Research Council. *System of Bacteriology*, 1931.
11. Topley and Wilson. *Principles of Bacteriology and Immunology*, Vol. I, p. 446, 1932.
12. Gray, J. D. A. *J. Hyg.*, 32:132, 1932.
13. Koser, S. A. *J. Bact.* 9:59, 1924.
14. Bardsley, D. A. *J. Hyg.* 34:38, 1934.

Diphtheria in Grays Harbor County, Washington

RUTH R. LAUE, R.N., P.H.N.

President, Grays Harbor Graduate Nurses Association, Aberdeen, Wash.

THE Grays Harbor Graduate Nurses Association in 1933 was composed of a group of about 35 public health minded members, confronted with an urgent community need. At their meeting in March discussion revealed that the diphtheria situation in the county was acute and immediate action was needed. Private duty nurses found diphtheria prevalent. The Metropolitan and Red Cross nurse also had found many cases of the dread disease. A number of deaths, cases of paralysis, and heart complications had come to our notice, stressing the great need for action. These were all too often found in homes where medical and nursing care were not available, through circumstances brought about by the depression and a lack of general knowledge of the situation. The general public was totally unaware of the existence of the disease in the community, with the result that the contagion was very rapidly spreading.

The county had no funds available to combat the spread of the disease and the state had never made provision for any type of immunization. Many of the nurses had children of their own and they especially realized the need of immunization. The time also seemed opportune, as many of the nurses were unemployed and it was obvious that any work done would have to be volunteer and that materials would have to be purchased as economically as possible.

The president of the association was vitally interested in the situation. Some

one courageously made the motion "to recommend immunization and assist in the inoculation." The project was to be a county-wide campaign against the spread of the disease.

Mrs. Mae Burwell was made chairman of the project. The county health officer was enthusiastic and secured the biologics through the State Health Department at a discount. A small amount of this work done in the county a few years before gave a basis for the per capita cost.

Action followed rapidly. Letters were written to the Grays Harbor Medical Association by a committee of nurses, and each physician was called on by the committee. The members of the Medical Association voted to give their services. Coöperation of the county and city superintendents of schools was needed and they were unanimously in favor of the project. Letters, through the schools, were sent into all homes to acquaint the parents with the necessity for treatment and to ascertain the number who would wish immunization. The schools then sent out notices giving the dates of the clinics.

The project grew in scope to include preschool children, parents, and teachers. In all, 102 clinics were held and more than 5,900 persons immunized, each person receiving in practically all cases, 3 inoculations. Cards were made for each child as a record, and certificates given each by the doctor at the last clinic.

The Grays Harbor Broadcasting Sta-

tion and the newspapers also greatly assisted in the matter of arranging these clinics. Interest in the project grew. Many nurses who were married and had retired from active work became interested and gladly gave their time. Many parents, when they realized the necessity for the treatment, took their children to their family physicians for inoculation—this made many immunizations of which the nurses' Association had no record—showing the educational value was far reaching, as immunization was discussed in every home in the county.

Sixteen doctors volunteered their services and an average of 5 nurses attended each clinic. Transportation was necessary as the county is larger than some of our New England States and in several instances necessitated a 50 mile drive. The county was restricted and small rural schools were grouped. Doctors and nurses started at the schools farthest away and worked their way homeward. Teachers gave their time and service willingly.

Standardization of materials and equipment was impossible, as each doctor employed his own technic, with which the nurses complied. Sterilization of equipment was not the least of the problems confronting the nurses. Some of them having steam pressure cookers and others having electric hot plates, assumed the responsibility of sterilizing the equipment for the clinics.

Dates for the clinics had to be made to meet the convenience of the doctors and the schools, both public and parochial.

Financing the project proved to be the biggest problem. So anxious were nurses and doctors for the immunization that they failed to stress the necessity for each person treated to contribute the small fee of \$.25. The cost of all correspondence, long distance telephone calls, drug supplies, equipment, as well as some laboratory expense for throat

cultures, and a part of the transportation, was paid by the nurses.

The American Legion Auxiliary assisted by having some one present at many of the clinics to receive the fees. They took charge of this money, and paid bills as long as the funds lasted. They also gave \$25 to the project.

The Orthopedic Auxiliary assisted with the transportation, providing cars and drivers. The Crescent Orthopedic assisted financially by contributing \$10.

The public became conscious of the need and were anxious for immunization, but the project grew to such proportions that it became too burdensome for volunteer labor, and had to be abandoned. Had there been funds available, county-wide immunization for smallpox and more diphtheria immunization could have been accomplished. Parents were invited to the clinics and doctors dispensed information willingly, answering many questions—thus the clinics truly were an unprecedented opportunity for public health education.

When the last clinic had been held, schools closed for the summer, and the last money turned in, the bills received showed a deficit of \$312, which did not seem a large amount when compared with the total cost of the clinics, approximately \$1,214, but it looked tremendous when faced by the Grays Harbor Nurses Association. A dance was given which netted a profit of \$57. Each school which had not paid was written to in the fall when school opened, but this availed little, though one city school collected \$22, one parochial school \$10, and a few schools sent small warrants. These, with the contributions mentioned brought the total debt down to \$188. The County Commissioners, who had promised the County Health Office to help if there were a deficit, were then approached, and very graciously agreed to pay this balance.

These troubles were small when compared with the gratifying results accomplished.

The effectiveness of the project can now be determined by the report from the State Department of Health, dated April 4, 1935, which is as follows:

<i>Diphtheria</i>	1933		1934	
	<i>Cases</i>	<i>Deaths</i>	<i>Cases</i>	<i>Deaths</i>
Grays Harbor County	5	1	2	..
Aberdeen	41	2	8	..
Hoquiam	14	2	2	..
Totals for county	60	5	12	0

In addition we are positive that many cases were not detected or reported to the Department of Health.

We have no record of any lasting harmful effects occurring in these clinics from the use of the "Toxoid."

NOTE: Were it possible, we would like to make special mention of many who contributed their time and special abilities, without which a project which involved so much detail and work could not have been carried out so successfully, and been made so pleasant.

Tacoma, Wash., Makes Progress

THE first free health survey in connection with the City Health Conservation Contests was awarded to Tacoma, Wash., and made in the fall of 1934.

Dr. Atwater, Executive Secretary of the American Public Health Association, was in Tacoma on July 10 and observed many worth while results of the survey. An excellent health council with splendid representation of all organizations has been organized. Definite improvement has been effected in the field of vital statistics and in venereal disease services, under Dr. S. M. Cresswell, City Health Officer. More effec-

tive coöperation with the school medical service is reported, with some 9,200 vaccinations. Tacoma Junior League provides a secretary for the Health Council. A very effective committee on public health education under the direction of Dr. Whittaker is working closely with physicians and dentists, among whom classes in effective public speaking are being organized. It is reported that the Western Washington Fair Association has given the Tacoma Health Council a permanent assignment of space for regular exhibits and has placed in its hands the censorship of all health, food and drug exhibits.

Flipping Device for Flange Rubber Stoppers

V. T. SCHUHARDT AND J. H. BREWER

*Assistant Director, and Bacteriologist, State Department of Health Laboratories,
Austin, Tex.*

THE advantages of the flange type rubber stopper for the safe distribution of various bottled biological products are obvious. The difficulty of flipping the flanges by hand during the process of bottling, however, renders the use of this type of stopper almost impossible, especially if rubber gloves are worn. Since we were not aware of any device on the market for performing this rather simple but important act, we decided to develop a mechanical flipper for our use in the laboratory.* The instrument has proved so thoroughly satisfactory that we feel it might be of value to others who are producing biological products.

The device is built of bronze and consists of four movable arms pivoted

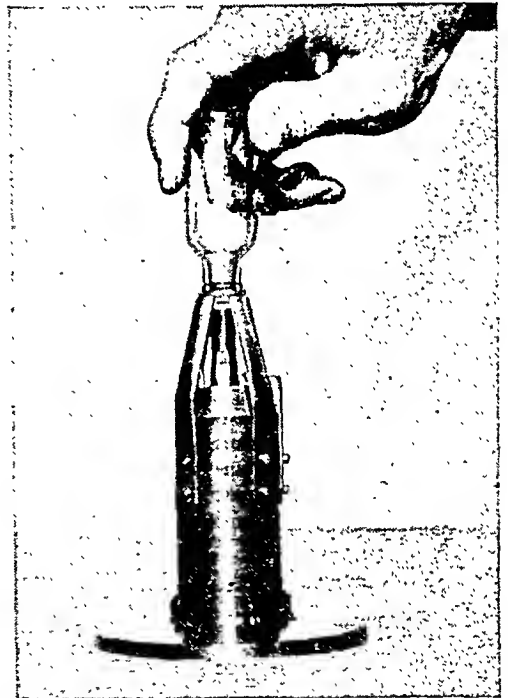


FIGURE II—Method of Operating Mechanical Flange Flipper

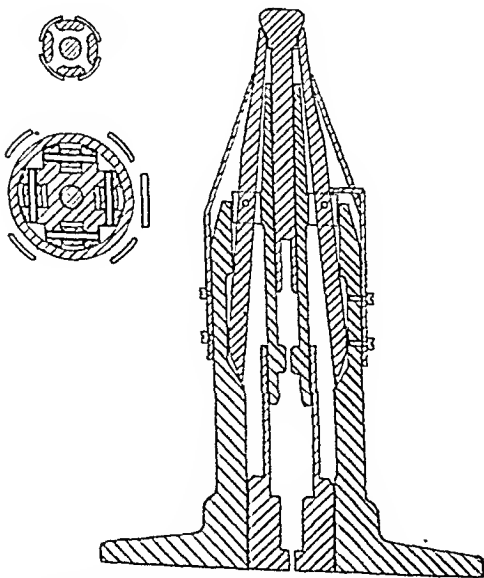


FIGURE I—Sectional Views of Flipping Device

at the center and sliding into a tubular base. The spreading action is obtained by a double cam arrangement. The first expansion is obtained by forcing the beveled nose-piece of the instrument down between the four arms, each of which is beveled at the top on the inside. The expansion is completed by

* We wish to give credit and express our appreciation to J. R. Blocker, machinist at the University of Texas, for perfecting and building the instrument.

the cam action due to the outside bevel at the bottom of the arms sliding down the bevel on the inside of the tubular base. This double expansion spreads the top of the arms sufficiently to encircle completely the lip of the bottle. As the arms move downward the edge of the stopper flange comes in contact with the top of the flippers. The latter consist of four bent strips of spring brass which are attached to the base and fit snugly against the outside of the movable arms. The continued downward movement of the bottle causes the flipping of the stopper flange. The flippers then slide on over the lip and

stretch the flange into place around the neck of the bottle. With the release of downward pressure two springs force the arms and nose-piece back to their resting position. One of the arms travels through a groove in a bent strip of bronze fastened to the base. This prevents rotary movement and keeps the arms in position relative to the four fixed flippers.

By varying the length and size of the arms and flippers and the circumference of the nose-piece an instrument can be made to use with any of the larger size serum bottles and flange stoppers.

A Neglected Opportunity for the Control of Respiratory Disease*

HOMER N. CALVER, F.A.P.H.A. (*Life Member*)

*Secretary, Public Health Committee of The Cup and Container Institute,
New York, N. Y.*

EVERY health officer at some time feels that he is like a juggler, keeping a dozen different things going in the air at the same time or balancing a variety of programs on the end of his nose. The wise health officer does not attempt to juggle everything at once, lest the whole collection come tumbling about his head. Instead, he varies his program from time to time, pushing first a diphtheria campaign, later the early diagnosis of tuberculosis, a child health day, or a summer roundup, or something else. Thus in the course of a year he has kept his whole program alive, kept his staff interested, and reaped public approbation through the newspaper support which can be given to special campaigns but is more difficult to get for routine activities.

Emphasis in public health programs changes like women's fashions. A new discovery, pressure waves from voluntary groups, enthusiasm of a specialist, sweep our activities this way and that, mold our efforts and force the Cinderellas of our program to the background while the more popular sisters shine in the light of current professional acclaim.

On what then can the health officer base his selection of activities? There is, of course, the *Appraisal Form* of the

American Public Health Association, and no health officer should attempt to run a health department without this as his constant guide; yet this document through its changing editions, reflects the changing favorites in our public health esteem.

It is desirable, from time to time, to take counsel with ourselves and examine the appropriateness of our activities. In such a stock-taking there are three simple practical criteria which are sound and which any health officer can use in determining where to direct his major efforts.

The first is that of disease prevalence. What are the biggest community health problems as indicated by morbidity and mortality rates and other statistics? If there were no other factors to be considered, these figures would at once clearly determine our attack. However, important as these figures are, this criterion cannot be used alone because we do not have any known means of effective attack on some of these rates.

The second, therefore, is, What are the known effective procedures? If this criterion alone were rigidly applied, our program would be quite elemental because there are, in fact, only a few procedures which are infallible: vaccination, inoculation against diphtheria and typhoid, pasteurization, water purification and a few others.

* Presented at the 11th Annual Meeting of the Pennsylvania Public Health Association, Harrisburg, Pa., May 21, 1935.

In addition to these two scientific criteria, there is a third practical consideration which the professional man is frequently apt to minimize. That is public opinion. Since we derive our support from public funds, we must do some of those things which the people who support us think we should do. Only in this way can we get continued support to do the things we want to do, pending that happy time when, through sufficient public education, the things we want to do and the things the public want us to do become identical.

THE CRITERION OF STATISTICS

Applying the first of these criteria to our local public health picture, we find a large group of diseases high in the list of causes of death, disease, and disability. They are the so-called respiratory diseases—pneumonia, influenza, scarlet fever, measles, tuberculosis, and others. Most workers believe that all of these diseases are communicable; yet nothing done so far has had any considerable effect in preventing their communication. We believe that all of these enter the body through the mouth; yet we have, in our public health procedures, constructed almost no barriers on this route of infection. We believe that most of them are principally infectious in their early stages; yet we are surprised that quarantine and other post-symptom measures have so little effect. Practically we have, as administrators, accepted defeat in the control of respiratory disease and are awaiting the discovery of some new vaccine, or other sure and easy process of creating an immune population that we will not have to bother about. While thus waiting for the laboratory to produce a solution, people are dying and morbidity rates do not decrease. According to the criterion of statistics, major efforts of the health department should be directed to control of respira-

tory diseases. I need not call your attention to the fact that the full picture of human disability is not given in the morbidity rates for these diseases. They may frequently be the initial factor in contributing to premature death in the later years of the individuals affected. A possibility of conquering just one of these diseases, as we have conquered yellow fever, cholera, typhoid fever, and diphtheria, is a great opportunity. Any possibility of controlling all of them is worth serious consideration.

WAITING ON THE LABORATORY

This brings us to a consideration of the second criterion—What can we do about control of respiratory disease? The defeatist attitude has not produced the brilliant public health victories of the past, and the continued high prevalence of respiratory diseases must act as a challenge to the present generation. In facing this challenge let us examine our current measures of attempted control. They can be classified under four headings: education, quarantine, medical service, and sanitation.

Programs of health education have been specifically aimed at inducing people to build their general health so that they may more successfully resist infection; to secure prompt medical attention; and to avoid infecting themselves and others. In view of the tremendous task to be done—the overcoming of prejudice, inertia and ignorance—changing habits of thought and actions of 120,000,000 people—the public health education program in this country has been puerilely weak. This is not in criticism of all those who with and without training for the task have worked sincerely in this field without much encouragement or anything like adequate support from appropriating bodies. To be thoroughly effective health education programs would require budgets resembling those of

national commercial advertising campaigns. Until funds for public health education have increased many-fold and our technics have become more certain, progress by the educational route will be slow.

Control through quarantine and isolation has been disappointing and some will say that these measures as ordinarily practised are practically without effect in preventing the spread of respiratory diseases. Most of these diseases are infectious in their incipient stages; many occur in mild form and are never diagnosed or reported; carriers play a part in the dissemination of some of them. Quarantine and isolation of the cases actually diagnosed and reported therefore segregate only a part of the potentially infectious population and this part temporarily, too late, and usually incompletely. Quarantine as a standard procedure in some of these diseases has already become less severe; at best it is an inadequate measure of control.

Medical treatment and nursing care of diagnosed cases are not to be omitted in listing measure of control, particularly as these services reduce the infectiousness of the attacked individual. They also may have a material effect in reducing the incidence or seriousness of after effects, postpone death, and thus are quite definitely public health measures with a bearing on the death rate. Good medical service and nursing care are essential in the public health control of any disease. They do not in themselves furnish a program.

Of the four measures of control then there are education which is weak, quarantine which is uncertain, medical service which is insufficient, leaving sanitation to be considered. The control of respiratory disease through sanitary measures has seldom been tried thoroughly in a sustained program. While waiting for the laboratory to discover a readier measure of control,

this may offer a fruitful means of attack. Sanitation as here considered means the establishment of procedures wherever possible to prevent the mouth discharges of infectious persons from being imbibed by others.

The only important point at which the health officer has it in his power to interpose barriers to this salivary exchange is in his supervision of public places serving food and drink. Furthermore, he is the only person who can erect and maintain this barrier. Among all of our public health programs sanitation of the public germ exchange as it exists today is one of the most difficult. The problem is complicated by lack of inspectors, uncertainty of procedures, the tremendous increase of public eating places, particularly of the rush order or counter type, and the hostility of food and drink dispensers to any program that requires them to spend money.

A recent and serious factor is the return of the saloon, or as we politely call it, the tavern. In prohibition days we could ignore speak-easies because they were supposed not to exist, and without legal existence we could not enforce public health ordinances to protect their customers. Now that the bar has moved from the basement to the first floor, or from the back room to the front room, we are necessarily faced with a sudden increase in our problem of sanitary supervision. There is a tradition among bar tenders that beer glasses should not be washed. This is fostered by the brewers. It has caused a falling off in the standards for all glass washing, according to the Los Angeles City Health Department.¹ With beer dispensing leading the downhill parade, vigorous action by health officers is called for if the gains which have been made are to be preserved. Already Vincent's angina is on the increase, and many communities have reported epidemics of this disease.

The U. S. Public Health Service,² the American Medical Association,³ and countless health authorities have reiterated that the commonly used unwashed drinking glass or other drinking or eating utensils may transmit infections; yet by and large, we have really done very little to eliminate the common drinking cup as it is seen at soda fountains, roadside stands, and quick lunch counters. A dip and splash in a tank of dirty water does not sterilize, yet this is about all the washing that most of our eating and drinking utensils get in many public places serving food and drink today. If we do not take this situation seriously, we cannot expect the public or the dispenser to.

Here is a statement from a news release of the health department of a large city:

At the larger resorts two men are on duty night and day and they see to it that hamburger and hot dogs stand keep meats and breads from possible contamination. Glass washing and the scalding of all dishes and cutlery is closely watched by these inspectors.

Such a statement is an insult to the intelligence of the thousands of people who patronize these stands and whose eyes tell them that glasses are not washed and dishes and cutlery are not scalded. But when an able and distinguished health officer makes a solemn statement of this nature and a child can see that the situation is otherwise, he invites the purveyor's disrespect of the law and dulls the sanitary sensibilities of the public.

There is no insuperable impediment to the sterilization of public eating and drinking utensils. The problem has been partly met in some places by the use of individual cups made of paper which are used once and thrown away. But where individual service of this kind is not desired there are available dishwashing machines of all sizes which effectively cleanse and sterilize. If this

equipment cannot be afforded there are inexpensive means of sterilizing by hot water, steam, or chemicals.

The importance of sterilization of commonly used eating and drinking utensils has been shown by many investigators. The studies by Cumming,^{4,5} and by Lynch and Cumming⁶ on the transmission of influenza are particularly thorough and significant. Nevertheless there is still a great need for continued research in this field. Many questions need further exploration such as:

1. What temperature of wash waters and exposure times are necessary to secure adequate bacterial destruction?
2. What criterion can be established for determining when cleansing is "adequate"?
3. What is the relative effectiveness under operating conditions of chemical sterilization versus heat sterilization?
4. Is there a test organism that can be used to measure pollution from respiratory sources as *B. coli* is used to measure pollution from intestinal sources?

In addition there is need for a simple standard method of laboratory examination by which the health officer can determine whether or not a dispenser of food and drink is obeying laws and ordinances. An inspection of the premises will not suffice. A standard method of examination of wash water or of dishes which could be used as a routine such as we have for the examination of water and sewage and milk would be most helpful in enforcement and would aid materially in comparing the results by various investigators in this field. Other more extensive studies, particularly in the realm of epidemiology, offer prospects of interesting and important results. These are problems which are particularly appropriate for the State Health Department and the universities of this state working in coöperation with local health officers.

Another phase of the program in which the state or national health au-

thorities may well take the leadership in the development of model laws and ordinances. Present regulations concerning the sanitary care of eating and drinking utensils are frequently ambiguous, sometimes impracticable, and in a few jurisdictions nonexistent. The present legal situation is analogous to that which existed in the field of milk sanitation before the adoption and promulgation of the model milk code by the U. S. Public Health Service. State and national leadership in the preparation of model laws will follow if local health officers demand it.

In the meantime much can be done under existing rules. The immediate arm of the health officer in this job is the inspector. With the limited inspection service which most health departments have there is all the more need for focusing this service on the most important tasks. Too often the inspector spends most of his time in observing and reporting on cleanliness of walls and floors and ceilings, whereas the habits of employees and the thoroughness of dishwashing have a more direct relationship to the prevention of disease. Many inspectors enter their jobs with but little training. The only training they get usually is a few days' observation of how the other inspectors handle their work. Thus the errors and deficiencies of the inspection service are carried on from one generation of inspectors to another. These men are important links in the chain of public health protection. A specific course of training for them would be a valuable aid. One city health department (Detroit) goes beyond this and has a program of instruction for the food handlers themselves. The universal adoption of this plan is worth consideration. The present offers a unique opportunity for concentrating on this task through the use of relief workers. The city of Chicago has recently added 200 inspectors to its staff

by this method. The use of more inspectors well trained for their jobs and focusing their efforts specifically on points of danger offers health officers another possible means of controlling respiratory diseases. To reach this objective requires more than a mere overhauling of the inspection service—it requires a completely new approach which will recognize the dignity of the task.

Finally there is a fourth weapon which can be used with little expense, namely, publicity. This was a powerful weapon in improving the milk supply and can be used with equal or greater effect in this field. Most of the things a health officer does are unobserved by the public. They can see no tangible evidence of his activity. The sanitary condition of public eating and drinking places is a matter of almost daily concern to a large number of the health officer's public. This latent interest can be mobilized behind the health officer. It is a force that can be brought to bear with particular strength—for dispensers of food and drink who obey the law, and against those who wilfully and repeatedly violate it. There are few communities in which the citizens would not welcome an opportunity to aid the health officer in a problem of public housekeeping such as this—one which exposes them to unpleasant conditions and potential dangers. Indeed, the health officer who takes the opportunity for leadership of this kind will win for himself a measure of esteem and approbation which should carry over for his whole program.

This brings us back to the third criterion for determining a program—public opinion. There is an unmistakable tide in modern America toward a higher standard of living, toward cleanliness and away from dirtiness. The situation which exists in public eating and drinking places, particularly soda fountains and other counter service

places, is an anachronism. It is on a par with the common drinking cup in railroad cars, and spittoons in the office. The people sense this but, not knowing how to change it, they accept it as the older generation accepted the open privy, and make jokes about it. At one eastern university when a couple of students go across the street for a milk shake or a "dope" they say "let's go over and swap spit." The health officer can capitalize on this latent public feeling and build good will for himself, his department, and his city administration. There is reasonable evidence to indicate that it offers an opportunity for the control of respiratory disease.

REFERENCES

1. De Groff, F. E. Beverage Bottling and Beer Dispensing. *A.J.P.H.*, 25, 3:336 (Mar.), 1935.
2. U. S. Public Health Service. Dangers of the Common Drinking Cup. Radio Talk, 1928.
3. Bauer, W. W. The Common Drinking Cup, Radio Talk. American Medical Association, Nov. 1, 1934.
4. Cumming, James G. A Brief Review of Indirect Contact Transmission and a Preliminary Report of Corroborative Laboratory Research. *A.J.P.H.*, IX, 6:414 (June), 1919.
5. Cumming, James G. Influenza-Pneumonia as Influenced by Dish-washing in Three Hundred and Seventy Public Institutions. *A.J.P.H.*, IX, 11:849 (Nov.), 1919; X, 7:576 (July), 1920.
6. Cumming, James G., and Lynch, Charles. The Distribution of Influenza by Indirect Contact, Hands and Eating Utensils. *A.J.P.H.*, IX, 1:25 (Jan.), 1919.
7. Floyd, Cleveland, and Frothingham, Langdon. Table Utensils as Sources of Tuberculous Infection. *Am. Rev. Tuberc.*, VI:53, 1922-1923.
8. Dearstyne, Roy S. Comparison of the Bacterial Counts from Machine and Hand Washed Dishes and Their Significance. *A.J.P.H.*, X, 11:871 (Nov.), 1920.
9. MacDonald, R. St. J., and Freeborn, Grace M. Sterilization of Eating Utensils. *Canad. Pub. Health J.*, 24, 2 (Feb.), 1933.
10. Mallmann, W. L., and Devereux, E. D. The Disinfection of Beverage Glasses by Chlorine Preparations. To be published in *A.J.P.H.*
11. Manheimer, Wallace A., and Ybanez, Theresa. Observations and Experiments on Dish-washing. *A.J.P.H.*, VII:7:614 (July), 1917.

Hermann M. Biggs Memorial Lecture

BIGGS had an orderly and logical mind. These qualities tempered his idealism and his professional vision. "Think things through" was his motto. No one before or since his time has combined with such idealism so practical a program for meeting the public

health and medical needs of his state. Had his program of 1920 been adopted in New York State and carried out in the several communities, we should have today no such serious problems in medical care and medical economics as now confront us.—Thomas Parran, Jr.

EDITORIAL SECTION

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THE PASTEURIZATION OF CERTIFIED MILK

AN important and far-reaching event in the progress of certified milk, and of milk sanitation generally, was the approval given to permissive pasteurization by the American Association of Medical Milk Commissions at their annual meeting in Atlantic City, N. J., in June, 1935. Following a remarkable program of papers devoted to this topic, the Association voted unanimously to include in its Methods and Standards, definitions and specifications for Certified Milk—Pasteurized, an action which will be received with acclaim by all health officials.

For more than 40 years certified milk has been recognized as a superior grade of market milk. It was developed as a quality milk supply in which physicians, sanitarians, and the public might have confidence, and it has always been produced by leaders in the dairy industry in accordance with uniform, national standards. These exceptionally high standards have been enforced not only by health authorities but by impartial medical milk commissions representing local medical associations. Today there are 81 such commissions in some 25 states.

Despite the high quality and excellent sanitary record of certified milk, and despite the somewhat limited sale of this necessarily more expensive product, many health officials have felt that pasteurization of it would be desirable and logical, since this process would add the final factor of safety to a clean milk of unusual quality. Numerous scientific investigations have shown that pasteurization would in no way impair the excellent nutritional qualities of certified milk.

The unmistakable trend toward pasteurization was recognized several years ago when the certified milk sold in Boston was subjected to this beneficial process. Today, the demand for pasteurized certified milk in this city exceeds that for the unpasteurized, an experience which has also been duplicated in a number of other communities where certified milk—pasteurized has been introduced in recent years.

Until last June these certified milks—pasteurized had not been sanctioned by the American Association of Medical Milk Commissions, and considerable opposition had been registered when the use of this process for certified milks was first proposed some 5 years ago. The present decision is, therefore, all the more

gratifying in revealing a spirit of progress, and of coöperation with health officials who have been advocates of the more general pasteurization of all market milks.

Since this wise procedure also has been endorsed by the Certified Milk Producers' Association of America, a substantial increase in the distribution of certified milk—pasteurized may be expected in the future. That the more extensive adoption of the process will result in greater public appreciation of this superior milk seems likely, especially if there is created a new national organization for the purpose of promoting greater consumption of certified milk, as was proposed by one of the speakers at the Atlantic City meeting.

It was pointed out at that time, and we agree, that the action taken in favor of permissive pasteurization was a landmark in the development of certified milk, an episode which is as significant to dairy science and to public health as was the institution of certified milk itself in 1893. Physicians and consumers who desire a clean and safe raw milk can still obtain it, but an even greater proportion of discriminating physicians and consumers who prefer that the best milk obtainable be pasteurized will at last be satisfied. Health officials will now have added reasons for recommending and advocating increased consumption of these certified milks.

"HEALTH TODAY AND TOMORROW"

UNDER the above slogan, a campaign has been opened by the National Health Council, with special reference to the local campaigns of various organizations related to the health movement in the United States.

During a 5 months nation-wide campaign, the Council will seek to dramatize its various objectives. A program of surveys of community health agencies will culminate in October on a date to be chosen by each community around October 21. On that date it is proposed that an open town meeting will be held after the pattern of the New England town meeting. At that time local people will ask leading questions regarding the health agencies and social services available in that community. Questions will be asked whether they are well managed and how adequate the plans and appropriations are for the purposes of that particular community.

This campaign is to be specially promoted in about 400 cities of the United States where both the official and voluntary health and social work organizations have promised strong coöperation.

The American Public Health Association is one of the 17 participating agencies in the National Health Council. Although this plan is aimed more directly toward the promotion of interests of various "operating agencies," this professional society of public health workers has taken the position that there are wide possibilities of usefulness in this campaign. It is also our opinion that the guidance of such town meetings as those planned in October is so important as to demand the informed participation of those qualified to lead in the public health field. Wherever it can succeed in stimulating public interest and extending public information this campaign can materially benefit health department personnel in their relationships with the public and there can be provided excellent background material for campaigns to expand the budgets of health departments.

The *Chairman* of the Committee for this campaign is Louis I. Dublin, Ph.D., who is working with the President of the National Health Council, Colonel Theodore Roosevelt. Information and assistance in this campaign may be secured by addressing the Publicity Director, Margery Currey at the National Health Council, 50 West 50th Street, New York, N. Y.

THE COPELAND BILL

THIS Association, at the Indianapolis meeting in October, 1933, recorded, by resolution, the confidence of its members in the principles and purposes of the Federal Food and Drugs Bill then pending in Congress.

In the year and more since that action, much has happened in Congress. The original Copeland measure died with adjournment in 1934. The new Congress received a new Copeland Bill, which passed the Senate in May, 1935, and is, at this writing, before the Committee on Interstate and Foreign Commerce of the House. Various observers are of the opinion that the Bill will receive early consideration by that committee and that a strengthened Federal Food and Drugs Law will probably be enacted at this session of Congress.

The need of a new food and drug law was emphasized by President Roosevelt, in a message to Congress, a few months ago. "A measure is needed," he said, "which will extend the controls, formerly applicable only to labels, to advertising also; which will extend protection to the trade in cosmetics; which will provide for a coöperative method of setting standards and for a system of inspection and enforcement, to reassure consumers grown hesitant and doubtful; and which will provide for a necessary flexibility in administration, as products and conditions change." In concluding his message, the President said:

The great majority of those engaged in the trade in food and drugs do not need regulation. They observe the spirit as well as the letter of existing law. Present legislation ought to be directed, primarily, toward a small minority of invaders and chiselers. At the same time, even-handed regulation will not only outlaw the bad practices of the few, but will also protect the many from unscrupulous competition. It will, besides, provide a bulwark of consumer confidence throughout the business world.

It is my hope that such legislation may be enacted at this session of the Congress.

The Copeland Bill, as passed by the Senate in May, will give to consumers new and additional protection, such as is not possible under the present law.

It prohibits false advertising of foods, drugs, and cosmetics.

It regulates the sale of cosmetics, requiring truthfulness in labeling and outlawing those injurious to health.

It prohibits, to a greater extent and under closer control than under existing laws, traffic in foods which are dangerous to health.

It bans the use of poisonous containers for food.

It requires adequate sanitation of establishments handling and manufacturing foods, drugs, and cosmetics.

It proscribes deceptive and slack-filled packages of foods and drugs.

It brings devices used as curative or preventive agents under the same regulation as drugs.

It provides for the regulation, for the protection of the consumer, of dangerous drugs and drugs subject to deterioration.

It makes provision for a Committee on Public Health to aid and advise the Secretary of Agriculture in promulgating regulation for the protection of the health of the public. It also provides for a Committee on Food Standards.

These committees, advisory in nature, are to be appointed by the President. The Public Health Committee is to consist of 5 members, designated without regard to political affiliation and with a view solely to scientific attainment and interest in public health, as it relates to foods, drugs, or cosmetics. The Committee on Food Standards is to have a membership of 7—3 representing the public, 2 representing the food industry, and 2 from the Food and Drugs Administration.

Members of the Public Health Committee and those members of the Food Standards Committee who represent the public are all prohibited from having any financial interest in the food, drugs, or cosmetics industry.

It is to be hoped that, when and if the Copeland Bill (S5) is passed by the House, it will be so amended as to permit the seizure, without restrictions, of shipments of drugs, foods, or cosmetics which are so misbranded as to be grossly deceptive.

The bill, as passed by the Senate, provides that only one seizure may be made of an alleged misbranded product, unless the enforcing officials can prove that the product is so misbranded as to render it imminently dangerous to health, or such misbranding has been the basis of a prior judgment in favor of the United States. This provision greatly limits the protective effects of the pending law in preventing the removal from the market of grossly misbranded products, which may not in themselves be "imminently" dangerous to the health of the consumer, but which would be valueless in the conditions indicated by the labeling.

The Copeland Bill (S5), as passed by the Senate and now before the House, will, if enacted into law, give to the consumer much needed added protection. Its principles and intent are the same as those contemplated by the first Copeland Bill, introduced in Congress in 1933, and approved by this Association in the resolution before mentioned. The reasons which influenced the Association in soliciting, in that resolution, the support of all members in behalf of the first Copeland Bill, apply with even greater force in the case of the Copeland Bill now pending.

MEDICAL HISTORY IN THE UNITED STATES

IT seems fair to credit the late Sir William Osler with having awakened interest in medical history in the United States. He was constantly looking up some great man of the past who had done big things in this country, though practically unknown to the present generation. Many arguments can be brought forward for the study of history. Dr. Osler said, ". . . I hold strongly with the statement that it is a sign of a dry age when the great men of the past are held in light esteem."

Another wise man who helped a great deal was the late Dr. Victor C. Vaughan. He told us that when cerebrospinal meningitis appeared in the United States it took us many months to learn facts about the epidemiology of the disease which had been demonstrated conclusively by French Army surgeons in the first half of the 19th century, the reason being that we did not know French history. He also pointed out that no one could claim to be learned in any specialty until he was fairly familiar with what had been done previously along the same line. This is an obvious fact, and yet too many in the medical profession fail to recognize it.

These statements are given point at the present moment when we learn that the *Annals of Medical History* is in danger of being discontinued, because, though it has many readers, it has few subscribers. It was founded under the editorship of Dr. Francis R. Packard, in 1917, and each number has been filled with interesting histories and reviews of literature. It is beautifully printed and is an ornament to any library. It would be a distinct loss if it had to be discontinued for any reason.

All of us can recall the desperate struggle which was carried on to keep alive

the *Index Medicus*, which was finally accomplished by merging it with the *Quarterly Cumulative Index of Current Medical Literature*, now published by the A. M. A., yet the medical profession would be handicapped without this publication.

The *Annals of Medical History* is necessary to us in this country, and we trust that interest enough can be aroused to secure sufficient subscribers to keep it going. This is another effort which might well be supported by some philanthropist, but it lacks the spectacular features which often carry a strong appeal.

America, though a new country, has produced many notable physicians and surgeons, who under the most trying circumstances and with meager facilities, have done great deeds for the advancement of their profession. Some of these men had European training and contacts with the older countries, but some of the most notable were pioneers in the truest sense, to whom God had given brains, resolution, and resourcefulness. While here and there the stories of different men are told, the *Annals of Medical History* is the only journal in the country which makes a business of collecting the histories of medical men and medical events. It could ill be spared.

PUBLIC HEALTH EDUCATION*

What Would You Like to See?—What kinds of materials, and what topics would you like to see at Health Education Headquarters at Milwaukee in October?

The editor of this department would like to hear from you.

The 1935 Health Education Institute—Elsewhere full details are published concerning the fourth institute conducted by the Public Health Education Section.

Those who enroll for the Institute in Milwaukee should bear in mind that *this year attention will be given to the problems of smaller cities and rural communities*. Those who come from larger places should not be disappointed and should not try to distract attention by any reference to their particular needs.

The Hall of Man in Buffalo—Buffalo may well become a Mecca for believers in the value of three-dimension displays in health education.

The Hall of Man, Buffalo Museum of Science, probably contains the largest collection of three-dimension health exhibits now available in this country.

A 20-page illustrated "Guide" is obtainable by sending 15 cents to the Museum.

The Microphone in Health Education—"Social Work at the Microphone" takes only a few of its examples from the health field, but as a whole this practical discussion applies to health education broadcasting.

The contents includes: five principles of broadcasting, types of programs, production, listening, and listening groups.

The reading list is limited to references carefully selected from a number of titles for helpfulness to educational broadcasters in the health and social work field. Health education provides two of the most useful titles under "Radio Techniques," and health sources are named under "Collections of Talks or Plays."

Issued by Social Work Publicity Council, 130 East 22d St., New York, N. Y. 17 mimeographed pages. 40 cents.

Town Meetings on Health—Elsewhere you have learned of the "Town Meeting" campaign sponsored by the national agencies represented in the National Health Council.

Diverse national and local activities will culminate in numerous "old fashioned New England town meetings" for the consideration of personal and community health.

Actively in charge are Margery Currey and Ralph M. Prouty, to be addressed at National Health Council, 50 W. 50th St., New York, N. Y.

Eager to Learn on the Job—One hundred and ten registered for the first Post-Graduate Study Course on Health Education, sponsored by the Committee on Health Education of the Conference of Tuberculosis Secretaries, and held preceding the recent annual meeting of the National Tuberculosis Association.

This record, and the equally too large attendance at the several Health Education Institutes in connection with

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

A.P.H.A. annual meetings, suggest that something should be done about it.

Some questions that seem to call for careful consideration:

1. What kinds of workers respond to these opportunities—classified as to job, experience, training, etc.?

2. What do they *think* that they need, and what do they actually *need*—as suggested by classification mentioned above?

3. What kind of a program should be planned, as well as the subject matter?

4. When and where could additional institutes be held to increase the total number of participants, and to reduce to manageable teaching numbers those present at each institute?

5. Could satisfactory programs be provided, and would there be a satisfactory registration for regional, or even state institutes?

6. Under what auspices could these more numerous institutes be held?

Probably such questions as the above should be considered even before taking up the details of number of sessions, fees, number of registrants to be accepted, how to screen the applicants to the best advantage of all concerned, and so on.

We hope that the Conference of Tuberculosis Secretaries, the Public Health Education Section, and the Committee on Professional Education of the A.P.H.A. will all participate in this important task of exploration.

"Syphilis—Press and Radio"—

Under this title a special collection of material which has been printed or spoken will be displayed at Milwaukee in October.

Original clippings or copies of editorials and news stories, and copies of radio talks will be displayed.

We hope to receive copies of material which has been suppressed.

"I Will Drive Safely"—This slogan and pledge is offered by *Ladies' Home Journal*, Philadelphia. It is supported by a series of articles and editorials: In the June, 1935, issue

Paul de Kruif argued that "Accidents Don't Happen." In July a page editorial submitted to its readers an emblem bearing the slogan, the emblem to be displayed on the rear of the car "as a token of your intention to drive carefully."

Write to Philadelphia for copies of the material issued by the *Ladies' Home Journal*.

The Summer Round-Up of Children—A total of 2,580 communities registered for the Summer Round-Up of Children, a project sponsored by the National Congress of Parents and Teachers, 1201 16th St., N.W., Washington, D. C.

Of those registering 1,417 communities were represented by units which carried through the plan. Children receiving the Round-Up examination numbered 92,268; 34,113 were vaccinated against smallpox; 27,101 received immunization against diphtheria in 1934.

Health workers may wish to ask for the 1934 report, and the detailed plan and work material for 1935.

Much remains to be done to carry to completion the 1935 Round-Up. Health authorities may readily locate the local units, if contacts have not been made already.

Again That Annual Report—In "Why Write or Print an Annual Report?" Dr. W. Frank Walker answers a group of questions which must be faced some time during the year:

Shall I write an annual report? Why should I? What is to be gained by it? What should be the form? What shall I put in it?

The whole article is something to be read when those questions came up.

In conclusion Dr. Walker says:

In deciding whether any detailed material should be included in the tabulation of service, the director should have clearly in mind

the purpose and advantage of including the material. Unless the figures go to support or illuminate the text already discussed or provide the reader with a background of detail which may be helpful to him later in deciding questions of policy, there is little point in including them. The mere fact that figures relating to the service have been collected over the year and the tabulation is available is no justification for taking the space in an annual report to present them, or the reader's time to consider them. When one considers the annual report as an opportunity to review critically the work of the organization, to present its services and problems to the executive board or to the public in a way in which they can be most readily understood, then one should have little difficulty in deciding what should be presented or, within certain limits, the most effective way of its presentation.

Supplementary to the above is "Monthly and Annual Reports," by A. J. Miller, with direct application to data collected by public health nursing groups.

Both articles in *Public Health Nursing*, 50 W. 50th St., New York, N. Y. June, 1935. 35 cents.

We Are Not Discouraged—In "Progress and Trends in Public Health in North America," Surgeon General Cumming, U. S. Public Health Service, gives background material of considerable value.

Speaking of health education Dr. Cumming said:

While we have often been discouraged by the apparently slow progress in educating our public in matters of public health, there nevertheless has been a dissemination of knowledge that even in the traditional field of public health endeavor little progress has been made against venereal diseases, that our infant mortality rate should be halved, that our maternal death rate is disconcertingly high, that because of our lowering birth rate and lengthened longevity we are an aging population, and that the problems of adult health are increasing in importance. The field of public health is broadened, the emphasis is shifting from accomplished environmental sanitation to personal hygiene and care. The people are aware of the great

store of medical knowledge and the benefits which would follow if they were available for all. It is common knowledge that despite the self-abnegation, altruism, and devotion of our profession a large proportion of our peoples do not, and cannot, under our traditional relationships of doctors and public receive the benefits of this knowledge. The economic depression with its consequent necessity for governmental aid in relief along other lines has focused attention upon this defect in our social relationships.

Given before a joint session of Canadian health bodies. In *Canadian Public Health Journal*, 105 Bond St., Toronto 2, Ontario. June, 1935. 35 cents.

"Are People Interested in Health?"—This question put editorially by "P.P.J." is answered in part by this statement:

Some idea of interest in public health may be obtained from the fact that within the last ten years one large publishing house has distributed 700,000 copies of the National Health Series, the 24 little books on health prepared by the National Health Council.

In *Journal of Outdoor Life*, 50 W. 50th St., New York, N. Y. June, 1935. 15 cents.

Health Education in June, 1935, Journal—*The American Journal of Public Health* carried references to health education in the June, 1934, issue.

In "Serving the Public for Health," by Vaughan (pages 681-686), are numerous references to health education including mention of:

. . . a whole-time health service with a full-time health officer assisted by adequately trained health educators . . .

In "Serving the Public for Health," by Pomeroy (pages 687, 694):

Public health education itself has distinct and specific limitations. The most successful campaigns of health education, in my opinion, rest partly upon individual health service.

In Dr. Pomeroy's summary:

3. Health education must include at pres-

ent both mass and personal instruction. In competition with cultism and quackery, demonstration and individual services are necessary to win many people back to scientific medicine.

See the whole of "Selling Health Department Members First on Health Education," by Williams (pages 715-719).

Also to be read in full is "The Community Program of Health Education," by Turner (pages 725-729).

Under "Toward the Solution of Social Medical Problems" (page 772), is mention of "an excellent distinction between health education and propaganda."

"What's a Committee?" quoted on page 740, reflects many a committee with a poor chairman, but its picture of "the ideal committee" is the expression of an ineffective chairman.

Massachusetts Wants to Know— And so do other states and cities want to know where to get health posters for school use.

A partial answer is supplied by "Some Posters on Child Health," an 8 page folder from American Child Health Association, 50 W. 50th St., New York, N. Y.

Here is the original request from Frank Kiernan, Massachusetts Tuberculosis League, Little Bldg., Boston:

There is a demand in Massachusetts for health posters for elementary and secondary schools. The orange and black posters of Gerta Ries which have been popular for several years seem to have outlived their usefulness. Do you know of anyone in the country who has done anything notable during the past year along this line?

The "Conspiracy of Silence" Is Breaking— Additional reports in this issue encourage the belief that both radio and journalism will give up their hypocritical silence on the venereal diseases.

We hope for additional reports.

We hope also that newspaper clip-

pings and letters will be sent to the two major broadcasting chains, addressing them at New York City.

Most people who write to newspapers and to broadcasting stations object to something. Hence it seems worth while also for health workers to encourage parents and others to thank their editors and their broadcasters when they talk normally and directly about syphilis, or when they permit others to do so.

Journal of Outdoor Life Passes— The *Journal of the Outdoor Life* will be discontinued in December, 1935.

Founded in 1904, and since 1910 published by the National Tuberculosis Association, this magazine was issued as an educational project, addressed primarily to tuberculosis patients.

The Board of Directors, at a recent meeting, decided upon the discontinuance, for reasons which have been summarized as follows:

(1) The diminishing number of tuberculosis patients who read the magazine; (2) Because of changes in opinion on the part of physicians, both in sanatoria, and in private practice relative to its value as a patients' magazine.

It is to be hoped that some medium will be found to carry on some of the *Journal* features.

MAGAZINE ARTICLES

"Atlanta Thyroid Clinic," by A. L. Whatley. *Junior League Magazine*, 305 Park Ave., New York, N. Y. July, 1935. This is a sample of reports in the magazine on local health activities of Junior Leagues.

"Birth Control before the Medicos." Report of decision of House of Delegates at Atlantic City to appoint a committee to report next year on the legal and medical aspects of birth control. *Literary Digest*, 354 4th Ave., New York, N. Y. June 22, 1935. 10 cents.

"Doctors, Patients, and the State," by John A. Hartwell, M.D., former

director of surgery at Bellevue Hospital, and chairman of Medical Advisory Committee, Emergency Relief Bureau. "To call attention to the fact that a problem in medical practice does exist and that socio-political forces are demanding its solution." *Harper's Magazine*, 49 E. 33d St., New York, N. Y. July, 1935. 40 cents.

"Great Falls, Montana, Works on Anti-Tuberculosis Campaign," by R. B. Caples. What the local Kiwanis did, largely in coöperation with the City-County Health Department. *Kiwanis Magazine*, 520 N. Michigan Ave., Chicago, Ill. June, 1935. 15 cents.

"Medical Magic," by David Dietz, science editor of Scripps-Howard. A series of feature articles on the scientific marvels behind disease and health.

"The Plight of Our Hospitals." Editorial on "a serious matter of public safety." *Saturday Evening Post*. March 16, 1935.

DATES AHEAD

Now is the time to gather photographs and movie pictures of outdoor activities in which health agencies are interested, or which they wish to further next winter.

All too often there is delay in getting satisfactory pictures from camps, sanatoria, bathing beaches, swimming, first aid, and so on.

Prints of news photographs, whether or not they are used in the papers, may prove useful in getting out printed matter.

Good amateur photographers or movie operators may well be cultivated at this season.

Careful search of the past may reveal an anniversary of some type which might be celebrated in the fall or winter, or at least could be used to advantage in a news story. One may rediscover a pioneer in health, a professional worker, or a prominent layman. The first printed report; the first educational leaflet; the first vital statistics for your community; or a "first" of some kind or other which could be used to advantage.

Note August topics which might be played up a year from now.

September is "Safety Highway Month." Write National Safety Council, 9 East 41st St., New York, N. Y., for information to be checked to see if you can do anything about it.

Does *Labor Day* have a health significance? Does it offer a chance to "point with pride" to better health conditions in and out of work places to which health agencies have contributed?

As school opens have we summer credits and fall obligations to discuss toward the better health of school children?

The annual meeting of the A.P.H.A. in October gives news value to many topics. Advance planning as to topics locally significant, and how to make use of the material presented at Milwaukee, should be resultful in your city or state.

Reorganization of the Federal Vital Statistics Division

AS Director of the Census, I am adopting this method of announcing a reorganization of the Division of Vital Statistics of the Bureau of the Census to those who are professionally interested. For approximately one-third of a century the fundamental task of the Bureau in this field was to extend the registration areas for births and deaths. With the admission of Texas to both areas in 1933, this primary responsibility was ended. The period since that time has been one of transition, in which we have sought to appraise and prepare for the new types of work for which we must now become responsible. We have realized that new tasks must be undertaken while past gains were preserved and consolidated.

In 1933, the Joint Advisory Committee of the Director of the Census took steps to explore the various questions and problems involved. Its inquiry resulted in a report to the Director on January 17, 1935. This report calls attention to the great opportunity for the development of vital statistics in this country. It asserts:

Country-wide registration furnishes comprehensive data for the first time. While it is still necessary to work for more complete and accurate recording of the facts as to births and deaths, new and intensive effort can be devoted now to analytical treatment of the data and to the presentation of more refined results. A better statistical basis for public health work will be laid, and for all studies of population structure and changes.

The United States is in about the same situation as England was in the last century when William Farr began his studies and publications, which placed his country in the position of unchallenged leadership in the public health movement.

Continuing, the report points to a num-

ber of specific "problems in vital statistics which press for solution," analyzes the qualifications of the personnel which should be entrusted with these problems, and concludes with detailed recommendations to the Director.

This report and its recommendations have been approved by the Director and the Secretary of Commerce. The reorganization now under way is the result. It is our immediate purpose to place new supervisory personnel in charge of each of three important types of functions within the Division.

Heading the Division as Chief Statistician will be Halbert L. Dunn, M.D. (University of Minn.), Ph.D. (Minnesota, in anatomy), Director of the University of Minnesota Hospitals, and Professor of Medical Statistics in the University of Minnesota Medical School. Dr. Dunn was a former director of the statistical work of the Mayo Clinic at Rochester. In addition to his general supervisory responsibilities, Dr. Dunn will have direct charge of the development of the research and analytic developments for which the report of the Advisory Committee calls. He will assume office on or before July 12, 1935.

As Assistant Chief Statistician of the Division, the Bureau has appointed John Collinson, M.D., D.P.H. (both Johns Hopkins), who has resigned his positions as Registrar of Vital Statistics for the State of Maryland and Secretary of the American Association of State Registration Executives. Dr. Collinson will be in immediate charge of the development and perfection of registration and of relations with state health officers and registration officials.

The Bureau is now negotiating for

the appointment of a Technical Assistant to the Chief Statistician for Vital Statistics who will have immediate charge of the classification and coding of causes of death, the development of the *Joint Manual*, representation of the Division respecting changes in the *International List*, and relations with medical schools and the medical profession.

The Chief Statistician will be especially assisted in the development of this program by Forrest E. Linder, Ph.D. (University of Iowa), whose scientific training and publications have been in the fields of psychophysics, biometrics, social and abnormal psychology. Dr. Linder resigned a position with the Worcester (Mass.) State Hospital to take office in the Bureau on June 1, 1935.

The Division's budget for the coming fiscal year likewise provides for the appointment of 6 field agents who will represent it in maintaining direct contacts with state officials. A districting of the United States for this purpose is contemplated. It is hoped to obtain for these posts, with the coöperation of the Civil Service Commission, well qualified young men of scientific and medical training.

These changes have permitted the assignment of the present Chief Statistician of the Division of Vital Statistics to other important functions within the Bureau of the Census. On or before July 12, 1935, Dr. T. F.

Murphy will become Chief Statistician of the newly established Division of Religious Statistics, General Information and Records. In this position he will be responsible not only for the forthcoming decennial census of religious bodies, but in addition for the development of the Bureau's too-much-neglected services of information to the public, and for its public relations generally. Willard C. Smith has been promoted, at higher grade and salary, to the post of Assistant Chief Statistician of the Division of Population, where he will bear much of the burden of the projected 1935 census of population, unemployment and occupations, and of developing the Bureau's activities in the population field in anticipation of the decennial inquiry of 1940.

The foregoing changes accompany others now taking place or in prospect in various Divisions of the Bureau of the Census. They are motivated by considerations of public service, scientific progress, and merit as a guide to the selection of personnel. It is our ambition to build up the Bureau to a point where it may without challenge be regarded as the best, as it is now the largest, statistical organization in the world. The Bureau will endeavor to merit support for its program, and we eagerly hope that readers of this announcement will continue to favor us with their confidence and coöperation.

W. L. AUSTIN, *Director*

BOOKS AND REPORTS

The Frustration of Science—By seven authors. Foreword by Frederic Soddy, F.R.S. New York: Norton, 1935. 144 pp. Price, \$2.00.

The thesis of this little volume is that the constructive possibilities of science are not being fully utilized, since we have failed to make the most of recent discoveries in many fields; while, on the other hand, the destructive possibilities are developing rapidly. Even medicine does not escape the general charge, and bacteriology, on which so much of modern medicine, surgery, and public health is based, is held as a menace through bacterial warfare, to which a chapter is devoted.

The book is distinctly pessimistic. Every thoughtful man must recognize that it contains a great deal of truth, without going as far in the gloomy outlook as the essays do. As far as medicine goes, it is pointed out that in Great Britain, Canada and the United States, there are adjustments and readjustments of the courses for medical students showing that all is not well with medical education. The reviewer believes that most of this is due to the reaching after higher and better things, rather than because so much is bad. It is perfectly true, as stated, that science and research are largely controlled by politics in spite of the many foundations, but even the best of these must indulge in some "window dressing." For example, in 1931, in Great Britain, not only were the salaries of the staff of the Medical Research Council reduced 10 per cent, but work which might have saved untold lives perished from inanition through the cutting down of funds.

Perhaps the three most injurious

things given as examples are aerial warfare, bacterial warfare, and the "invention" of sterility. The surprising statement is made that science is losing its prestige in Germany, of all places.

The last paragraph in the book holds that there are only two ways to go; the road which we now seem to be following leading to Fascism, with restriction of output, lowering of the standard of life of the working classes, and a renunciation of scientific progress; while the other leads to complete socialism, which will want all the science it can get to produce the greatest possible wealth.

The book consists of 7 chapters or essays, written by as many different men, the whole being edited by Professor Frederick Soddy. The book merits attention by thoughtful people. The reviewer is not competent to express a positive opinion on the matters discussed, but cannot help hoping that the writers are unduly pessimistic. May their warning lead to further study and avoidance of the dangers.

MAZÛCK P. RAVENEL

Communicable Diseases for Nurses—By Albert G. Bower and Edith B. Pilant (3rd ed.). Philadelphia: Saunders, 1935. 420 pp. Price, \$3.00.

This is a revised and greatly improved text which will be equally useful to nurses working in general hospitals and those employed in hospitals for communicable diseases—to nurses caring for the sick in homes and to those working in institutions. Emphasis is put in prevention as well as care of communicable disease.

The subject matter is thoroughly up-

to-date and is really interesting. Public health nurses especially will appreciate the inclusion of scabies which was left out of earlier editions. "Athlete's foot" was the only disease we looked for and could not find.

We hope the book will have a wide circulation among graduate nurses although it is designed as a textbook for student nurses.

EVA F. MACDOUGALL.

Heredity and Disease—By *Otto L. Mohr*. New York: Norton, 1934. 253 pp. Price, \$3.50.

This book is an outcome of a series of lectures which the distinguished Swedish geneticist gave at Harvard University in the autumn of 1933. The clarity of exposition and the sanity of the conclusions are such that the book ought to be compulsory reading for any person who is interested professionally in the genetics and constitution of the human being.

The book starts in the conventional way by an exposition of the principles of inheritance along the familiar Mendelian lines and includes a very clear account of the gene theory and the genetic experimentation. It is in the part of the book which goes on from special topics to the bearing of genetics on affairs which gives it its special character and value. Thus, the author considers the common neurologic diseases of familial type, diabetes, allergy, and the occurrence of the lethal genes in man. This term is used to indicate those abnormalities usually classed as monstrosities and abortions. Interesting as these chapters are, there is a very valuable discussion of such topics as the X-ray and mutation in which the author discusses the classic and revolutionary work of Müller showing that mutation rate can be increased by environmental events. His discussion of alcohol as a factor in human life which does not tend to create hereditary dis-

eases of mankind demands the attention of those who glibly assume that alcoholism in an ancestor is a cause of mental disease in a descendant. His discussion of such matters as intermarriage and cross-breeding, degeneration, race-crossing, the blue blood, brings this book from a mere treatise on heredity into an important social document which clears the air of fallacy and misconception.

There has been a prevailing tendency among geneticists of the type called eugenists to build up an aristocratic ideal of life which is entirely unwarranted in so far as biology itself is concerned. That there is an aristocratic basis for human affairs is true, but it does not run parallel to the social structure as it is at present constituted. There is no exclusion of the environment in this book as a genetic factor. There should be none. The scientific day is now past when the student of genetics, in so far as it concerns human affairs, can exclude the environment in any discussion of heredity.

ABRAHAM MYERSON

The Harvey Lectures. Delivered Under the Auspices of the Harvey Society of New York, 1933-34. Series 29. Baltimore: Williams & Wilkins, 1935. 262 pp. Price, \$4.00.

This volume contains as a frontispiece a photograph of the late Dr. Alfred Fabian Hess, President of the Society at the time of his death, followed by an appreciation of him and his work, which alone would make it valuable.

Without disparagement to the volumes which have gone before, we feel that the addresses contained in this series are of unusual interest and value. It would be invidious to pick out certain ones, and at best, a selection of this sort would depend largely on the training and individual taste of the

reviewer, since all of them are by men who are recognized as authorities in their line of work, and concern matters of great scientific interest; some of them of more direct practical interest than others.

The printing and binding of the book are excellent, as are the quite numerous illustrations. MAZŸCK P. RAVENEL

Foods and the Law—*By Alexander P. Blanck, of the New York Bar. New York: Peter Smith, 1935. 246 pp. Price, \$2.50.*

This manual for the business man on the laws of the United States with reference to foods and food products presents a simple and non-technical discussion of the federal requirements regarding foods and their interpretation by the courts. The material is clearly stated and should be understandable by persons desirous of information on this complex subject. About half of the book is devoted to the actual texts of the Food and Drugs Act and the rules and regulations of the Department of Agriculture for its enforcement. There is no index.

This well printed book should be of interest and value to food and drug officials and to health officers concerned with this subject, as well as to manufacturers of food products.

JAMES A. TOBEY

The Administration of Health and Physical Education—*By Jesse F. Williams and Clifford L. Brownell. Philadelphia: Saunders, 1934. 598 pp. Price, \$3.00.*

The authors have succeeded in producing an excellent text in a field that has had little recent textbook emphasis.

While there are chapters on Health Service, Handicapped Children, and Health Instruction, the great bulk of the book is devoted to the sanitation of the school plant, to discussions of organization and administration, and to

the facilities and equipment needed for a modern program of physical education.

The discussion of these facilities covering standards of space, number, sanitation, and supervision of gymnasiums, locker rooms, showers, swimming pools, and play fields is well done. Not for years has this material been gathered and set forth in one work.

Chapters on intramural athletics, measurements in health and physical education, the use of publicity, and on budgeting and finance, round out an excellent text.

The educational theories and ideals are kept well to the forefront. The emphasis on the building of skills and training in sports that have a health and recreational value in later life, in preference to interscholastic team games, presents the best thought of the well trained physical educator and school administrator.

This text should be part of the library, not only of all physical educators, but of school administrators, health officials, and others who may be responsible for the building, sanitation, finance, or administration of physical education plants, or for their management. CHARLES H. KEENE

Elementary Human Anatomy, Based on Laboratory Studies—*By Katharine Sibley. New York: Barnes, 1935. 360 pp. Price, \$4.50.*

This text is written with the special aim of providing the student of physical education with usable material for his professional background. Therefore, although all the anatomical parts and organs of the human body are discussed, special emphasis is put on osteology, syndesmology, myology, and the nervous system.

Special diagrams of movement and for palpation of anatomical parts—particularly of joints and muscles—

supplemented by discussion of the use of human specimens in the laboratory, make this text particularly valuable for the study of kinesiology and for the physical therapist.

The illustrations, numbering 213, are excellent, the parts depicted being profusely labelled.

The discussion of the function of parts, especially of the action of muscles, is peculiarly valuable for the student of physical education.

While there are many anatomies, both unabridged and condensed, this *Elementary Human Anatomy* is a real contribution to the educational aids for the special group for whom it is designed.

CHARLES H. KEENE

Fifty Years in Public Health: A Personal Narrative with Comments—By Sir Arthur Newsholme, K.C.B., M.D., F.R.C.P. Vol. I—The Years Preceding 1909. London: George Allen & Unwin, Ltd., 1935. 415 pp. Price, 15 s. net.

This first volume of Sir Arthur's memoirs published in England covers a period in the history of public health and preventive medicine during which phenomenal progress was made. The reader sees these events through very discerning eyes and he may be reminded as he reads of the observation of Dr. William H. Welch that the best approach to the understanding of any subject is the historical.

Such a personal narrative holds certain advantages for the reader, particularly for those who have learned to admire the stimulating and incisive mental approach which has characterized Sir Arthur's written and spoken words these many years. Any medical man whose life has brought contacts with such outstanding figures as John Simon, Edwin Chadwick, William Farr, and Max von Pettenkofer, will have an interesting story, and these circumstances are all the more significant

when the narrator is one who can appreciate the historical significance of these contributions and relate them closely with present-day affairs. One sees our current efforts in tuberculosis control, for example, in a new light in reading the debate on notification of the disease which occurred in England a full decade before it was an acute problem in America. There are many similar subjects which passed through phases of discussion in England before they came into the foreground here, and one familiar with this progress of thought can sometimes speak prophetically with justifiable confidence.

Such a personal narrative affords the opportunity for the author to relate many circumstances of life in England in the 1860's and 1870's which are of importance to public health, though much more evidently so in the light of such an interpreter. There were cultural and religious habits which bore heavily on hygiene when viewed in the long perspective, and one who understands the educational methods of those days can the more readily appreciate the advantages of our own time.

Chapters devoted to the decline of typhoid fever, to infant and child welfare, to housing and poverty, to the continuing struggle against tuberculosis, to vital statistics, and to public medical service, reflect the various fields of interest in which Sir Arthur has been distinguished. His skillful style serves to bring to the reader the important facts in these matters with a minimum of effort. For background purposes the volume can be highly recommended to students of the public health. How significant and hopeful it would be if all physicians might be aware of the development of their science in England! We might more easily achieve a new degree of social mindedness in things medical.

American readers will look forward eagerly to the coming publication of

the second volume in this series, which will review the experience of the years after 1909, during which the author's services to America were even greater than in the earlier period.

REGINALD M. ATWATER

Drugs Against Men—By *Henry Smith Williams, M.D.* New York: McBride, 1935. 184 pp. Price, \$1.75.

This book by a well known scientist gives a large amount of information on the various drugs which are considered injurious to mankind when taken in excess, and which are not necessary to the well-being of the normal person. Some of them, morphine for example, we recognize as indispensable for medicinal use.

The author considers that as a generation we are weaklings, needing drugs to give us the illusion of stability. The book is written for the large class of individuals who are of such unstable, nervous organization as to lack will power to resist the allurements of drugs, among which he includes caffeine, alcohol, the narcotics, the bromides, chloral, aspirin, veronal, and other such products—all "props" for the unstable nervous system.

There can be little question of the correctness of the statements which he makes, but we believe he has gone to unnecessary length in emphasizing some of them. The advice which he gives for abstention from practically all of these is sound, and we feel that the race would be just as well off if his advice were followed to a considerable extent, though we cannot go as far as calling the person who drinks one cup of coffee per day at breakfast a caffeine addict.

Each chapter ends in a summary which gives conclusions and a preachment, printed in italics. All doctors will agree with the author that the administration of the Narcotic Act should be changed and that medical

men should not be restricted by rules made by laymen and enforced by laymen, who in too many cases are political heelers. The author dwells on what he calls the "Los Angeles Reign of Terror." As he says, "it could have happened nowhere else except in America and would not have been tolerated for an hour in any other country of the world, ancient or modern." He followed the court trials in Los Angeles in person. He gives the facts about what he calls "The Billion Dollar Racket." He tells how the Los Angeles Medical Association in December, 1934, threw down the gage to the organized forces of the "dope" racket, and feels that organized medicine must come to the rescue.

We would like to quote at greater length from this book, which we believe will do good, in spite of the opinion that the author is somewhat extreme in his deductions. MAZYCK P. RAVENEL.

Maternal Mortality in Philadelphia—Report of Committee on Maternal Welfare—*Philadelphia County Medical Society*, 1934. 143 pp. Price, \$1.00.

As in the case of the New York report which appeared in 1933 and was reviewed in these columns, this report from Philadelphia represents a sincere attempt to add something to our knowledge of the causes and prevention of maternal mortality, and to improve conditions in the city in which the study was made. It deals with 717 deaths occurring in Philadelphia in 1931-1933. The death certificates were studied and the information so obtained was supplemented by visits to hospitals and physicians, midwives, and families. The data were reviewed by an Analysis Committee.

Space forbids going into many details of this study; the best one can do is to touch on a few significant points with a recommendation to the

reader to go over the whole valuable report for himself.

At the outset a good impression is created by the report's fair discussion of the maternal mortality rate of the United States as compared with the rates of other countries. Much time and space have been wasted on occasion in trying to compare rates which are not fairly comparable—and in propaganda based on such futile comparisons.

There is an interesting and provocative statement of the criteria used by the committee in determining whether to classify a death as preventable or non-preventable and upon whom to lay the responsibility. They frankly state that they have erred, probably, in placing too many deaths at the door of the physician. If this is so, while the motive was good the result may be unfortunate. There is no dearth now of loose talk in newspapers and magazines, exaggerating the responsibility of the medical profession for the maternal mortality; it would serve no good purpose to add to it.

The Analysis Committee in making up its rates and deciding concerning the preventability of death in a given case frequently changed the diagnosis from that given on the death certificate to one which seemed to them to be more in accordance with the facts. For example, 31 of the cesarean certificates were considered to be incorrect, and 22 of them were changed to septic infection. This sort of post-factum decision probably adds considerably to the accuracy of the whole study in the hands of a conscientious and able committee such as this one, but at the same time has its perils.

One finding of the committee emphasizes what a number of commentators have been insisting for some time, namely, that the importance of septic abortion as a factor in maternal mortality has not yet received sufficiently

widespread recognition. This cause was responsible for more than one-fifth of the deaths in the Philadelphia series. Nearly 63 per cent of these were cases of illegal abortion. It is pointed out that if these could have been eliminated there would have been 14 per cent fewer deaths. It is one thing, however, to recognize this needless waste of life, and quite another to do anything effective about it. Neither public education nor the thunders of the Church affect it greatly, it would seem. And speaking of the Church, the committee regarded as non-preventable deaths those due to refusal of a necessary operation on religious grounds. Such deaths are understandable, but can one call them justly non-preventable.

The committee's "Recommendations and Discussion" at the end of the report are definite and frank. Most of them beyond doubt are sound. Nevertheless, one statement appearing here, and a fundamental one at that, seems to the reviewer not to be based on sufficient evidence. It is: "The responsibility for the high maternal mortality in Philadelphia rests primarily with the medical profession, hence the problem of reducing it belongs to the physicians." Such a statement implies that we now have a clear understanding of all the factors entering into the problem of maternal mortality—in Philadelphia or any other community. This certainly seems not to be the case; and every study made only emphasizes the fact that there must be missing or unappreciated factors. Otherwise, how explain the practically undiminished mortality in the face of increasing improvement in medical, nursing, and hospital care, and in public education. A greater effort to evaluate such things as the racial factor or the more or less intangible effect of modern civilized life on the function of childbearing might furnish a lead. Still another need is more studies of control groups—women

delivered under unfavorable conditions and without adequate prenatal care who do *not* die. It begins to look as if the usual type of statistical study cannot be depended upon to clear up the still elusive puzzle of a relatively stationary maternal mortality.

MERRILL E. CHAMPION

Health Education in Senior High Schools—By Dorothy Ruef. *New York: Teacher's College, 1934.* 106 pp. Price, \$1.50.

After 25 years of the modern trend away from physiology toward education for health, educators are entering on that phase that always appears in any enduring effort—the investigation of procedures and results.

This text is a study of personnel, or-

ganization, activities, relationships, and qualifications of staffs in this field of education in New Jersey. It concludes with a summary and recommendations for: a state program of health education for high schools; definite organization of the program fixing responsibility; better training of the specialists and teachers in health education; state certification not only for teachers, but for physicians, nurses, and dentists, with better training for these and placing them on a full-time basis; and an improvement of relationships—closer help and instruction—between the state department of education and the teachers in the field and a better coördination of the health education program within individual schools.

CHARLES H. KEENE

BOOKS RECEIVED

METHODS AND MATERIALS OF HEALTH EDUCATION. By Jesse Feiring Williams and Fannie B. Shaw. *New York: Nelson, 1935.* 331 pp. Price, \$1.65

A SQUARE DEAL FOR THE NARCOTIC ADDICT. By William H. Ladue. *Plattsburgh: the Author, 1935.* 131 pp. Price, \$1.00.

THE SUBNORMAL MIND. By Cyril Burt. *New York: Oxford, 1935.* 368 pp. Price, \$3.75.

OSLER'S PRINCIPLES AND PRACTICE OF MEDICINE. Revised by Thomas McCrae. 12th ed. *New York: Appleton, 1935.* 1196 pp. Price, \$8.50.

CHILD NUTRITION ON A LOW-PRICED DIET. By Mary Swartz Rose and Gertrude M. Borgeson. *New York: Teachers College, 1935.* 109 pp. Price, Paper, \$1.00, Cloth, \$1.50.

HOW LIFE BEGINS. By George L. Bird. *Chicago: Book House for Children, 1935.* 117 pp. Price, \$1.00.

TROPICAL MEDICINE. By Leonard Rogers and John W. D. Megaw. 2d ed. *London: Churchill, 1935.* 547 pp. Price, \$5.00.

HOSPITAL ACCOUNTING AND STATISTICS. A Manual for American Hospitals. By Michael M. Davis, *et al.* *Chicago: Ameri-*

can Hospital Association, 1935. 85 pp. Price, \$1.00.

NEW AND SUPPLEMENTARY FACTS AND FIGURES ABOUT TUBERCULOSIS. Compiled by Jessamine S. Whitney. *New York: National Tuberculosis Association, 1935.* 46 pp. Price, \$.50.

1000 QUESTIONS AND ANSWERS ON T. B. Edited by Fred H. Haise. *New York: Journal of the Outdoor Life, 1935.* 232 pp. Price, \$.75.

A RECORD BOOK FOR TUBERCULOSIS PATIENTS. By Lawrason Brown. *New York: Journal of the Outdoor Life, 1935.* Price, \$.15.

MAKING THINGS HAPPEN IN THE CHRISTMAS SEAL SALE. A Publicity Manual. By Dwight Anderson. *New York: National Tuberculosis Association, 1935.* 53 pp. Available through State Tuberculosis Associations.

NUTRITION WORK WITH CHILDREN. A Revised and Enlarged Edition. By Lydia J. Roberts. *Chicago: University of Chicago Press, 1935.* 639 pp. Price, \$4.00.

A NEW DEAL IN LIQUOR. A Plea for Dilution. *New York: Doubleday, 1935.* 239 pp. Price, \$2.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

A Check on Prevention—Reduction in diphtheria mortality in the large cities seems to be petering out. Only 40 fewer deaths occurred in 1934 than in 1933. New England and the West South Central States gave the best records. Diphtheria still shows itself amenable to control measures.

ANON. Diphtheria Mortality in Large Cities of the United States in 1934. *J.A.M.A.* 104, 24:2182 (June 15), 1935.

Nurse-Midwifery in England—Comments upon a recent report on the midwife situation in England, by Dame Janet Campbell, recommending fewer schools and midwives, better training, and that all midwives have nurse's training as a foundation.

ANON. Maternity Service in England. *Canad. Nurse*, 31, 5:209 (May), 1935.

Another Public Health Yardstick—Although the same number of people died of typhoid fever in 1934 as did in 1933, there are encouraging signs of a basically improved situation. An honor roll of cities with no deaths is published, three of which have had no fatalities for 4 consecutive years. An enviable record.

ANON. Typhoid in the Large Cities of the United States in 1934. *J.A.M.A.* 104, 23:2093 (June 8), 1935.

Convulsions in Infancy—In babies that showed history of convulsions, acute infections were the most common cause, accounting for 30 per cent of the number studied. Pneumonia, acute upper respiratory disorders, and sepsis were the most common offenders of this group. Acute central nervous system diseases followed (meningitis being

largely responsible), then infantile tetany, cerebral deficiency, cerebral birth injury, and acute nutritional disturbances. These groups are further analyzed according to age.

BROWN, J. E. Convulsions in Infancy. *Ohio State M. J.* 41, 6:423 (June), 1935.

Public Health Nursing in the West—Completion of a public health nursing survey in San Francisco by the public health nursing committee of the Health Council of the Community Chest led to the recommendations: (1) that a permanent committee be established within the Health Council to correlate nursing services; and (2) that the committee direct a demonstration in public health nursing under centralized direction in a selected area.

CRAIGHAN, L. A. Survey of Public Health Nursing in San Francisco. *Pacific Coast J. Nurs.* 31, 5:254 (May), 1935.

Laboratory Tests for Syphilis Compared—Serum specimens from a large number of syphilitic patients and non-syphilitics were sent to 13 serologists. The study reveals the relatively equal value of complement fixation and some of the more satisfactory flocculation tests.

CUMMING, H. S., *et al.* The Evaluation of Serodiagnostic Tests for Syphilis in the United States. *J.A.M.A.* 104, 23:2083 (June 8), 1935.

What to Tell about Health—The author who listed 23 health "beliefs" to be unlearned now discusses what can be told in health education. In addition to nutrition, exercise and rest, he includes mental hygiene, poisons, parasites, accidents, and organ mal-

ASSOCIATION NEWS

NOMINATIONS FOR THE GOVERNING COUNCIL

IN accordance with the By-laws of the Association, the Nominating Committee reports the following nominations for the Governing Council. The Constitution provides that "upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, pro-

viding such petition is received 15 days before the Annual Meeting."

The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in Milwaukee will be elected for the three-year term, 1935-1938.

Alice C. Bagley, R.N.,
600 Stockton Street,
San Francisco, Calif.

J. N. Baker, M.D.,
State Board of Health,
Montgomery, Ala.

M. E. Barnes, M.D.,
State University of Iowa,
Iowa City, Ia.

W. W. Bauer, M.D.,
American Medical Association,
535 N. Dearborn Street,
Chicago, Ill.

E. L. Bishop, M.D.,
Tennessee Valley Authority,
Knoxville, Tenn.

F. C. Blanck, Ph.D.,
Bureau of Chemistry and Soils,
Washington, D. C.

Ernest Boyce,
Chief Engineer, Division of Sanitation,
State Board of Health,
Lawrence, Kans.

W. F. Cogswell, M.D.,
Dept. of Public Health,
Helena, Mont.

Selwyn D. Collins, Ph.D.,
U. S. Public Health Service,
Washington, D. C.

R. D. Defries, M.D.,
5 Cluny Drive,
Toronto, Ont, Canada.

W. Thurber Fales, Sc.D.,
Director, Bureau of Vital Statistics,
City Health Department,
Baltimore, Md.

John A. Ferrell, M.D.,
Rockefeller Foundation,
49 W. 49th Street,
New York, N. Y.

Elizabeth G. Fox, R.N.,
35 Elm Street,
New Haven, Conn.

Amelia Grant, R.N.,
Department of Health,
New York, N. Y.

Paul Hansen,
Consulting Engineer,
6 N. Michigan Avenue,
Chicago, Ill.

Victor G. Heiser, M.D.,
Metropolitan Tower,
Leonard Wood Memorial for Eradication of
Leprosy,
New York, N. Y.

C. A. Holmquist,
Director, Division of Sanitation,
New York State Dept. of Health,
Albany, N. Y.

H. E. Kleinschmidt, M.D.,
National Tuberculosis Association,
50 West 50th St.,
New York, N. Y.

J. H. Mason Knox, M.D.,
2411 N. Charles Street,
Baltimore, Md.

A. Lessard, M.D.,
129 Ave des Erables,
Quebec, Que., Canada.

Kenneth F. Maxcy, M.D., Dr.P.H.,
P. O. Box 701,
University, Va.

J. F. Norton, Ph.D.,
Upjohn Company,
Kalamazoo, Mich.

W. B. Palmer,
Milk Inspection Association of the Oranges,
Orange, N. J.

M. P. Ravenel, M.D.,
University of Missouri,
Columbia, Mo.

C. O. Sappington, M.D.,

330 S. Wells Street,
Chicago, Ill.

William A. Sawyer, M.D.
343 State Street,
Rochester, N. Y.

R. R. Sayers, M.D.,
U. S. Public Health Service,
Washington, D. C.

Estella F. Warner, M.D.,
U. S. Public Health Service,
Washington, D. C.

C. F. Wilinsky, M.D.,
330 Brookline Avenue,
Boston, Mass.

Abel Wolman,
2411 N. Charles Street,
Baltimore, Md.

NEW OFFICERS WESTERN BRANCH A.P.H.A.

THE following officers were elected
at the 6th Annual Meeting of the
Western Branch, in Helena, Mont.,
July 3, 1935:

President—W. F. Cogswell, M.D., Helena,
Mont.

President-Elect—H. E. Young, M.D., Vic-
toria, B. C., Canada

Vice-Presidents—J. D. Dunshee, M.D.,
Sacramento, Calif.; J. L. Jones, M.D., Salt
Lake City, Utah; and W. H. Kellogg, M.D.,
Berkeley, Calif.

Secretary—W. P. Shepard, M.D., San
Francisco, Calif.

Treasurer—William Ford Higby, San Fran-
cisco, Calif.

Regional Board—Guy S. Millberry, D.D.S.,
San Francisco, Calif.; George C. Truman,
M.D., Phoenix, Ariz.; Carl E. Green, Port-
land, Ore.; Fred Stimpert, Helena, Mont.;
Ernestine Schwab, San Francisco, Calif.;
John J. Sippy, M.D., Stockton, Calif., to
serve the unexpired term on the Regional
Board of Dr. Jones, who as a vice-president
is automatically a member of the Board.
This term expires in 1936.

Chairman of Executive Committee—Fred
Stimpert, Helena, Mont.

The 1936 meeting will be held in
Vancouver, B. C.

APPLICANTS FOR MEMBERSHIP

*The following individuals have applied for membership in the Association. They have
requested affiliation with the sections indicated.*

Health Officers Section

Robert W. Ball, M.D., P. O. Box 213, Colum-
bia, S. C., Richland County Health Director
Edgar Bieber, M.D., 501 Deer St., Dunkirk,
N. Y., City Health Officer

Pedro de la Camara, M.D., Centro Secun-
dario de Higiene Rural, Arevalo, Avila,
Spain, Health Officer

W. Taylor Chamberlin, M.D., 359 Fulton
Ave., Hempstead, L. I., N. Y., Health
Officer

Paul L. Eisele, M.D., Ripon, Wis., Health
Officer

J. W. Erwin, M.D., Savannah, Tenn., Health
Officer

Roscoe Faulkner, M.D., Trenton, Tenn., As-
sistant Director, Gibson County Health De-
partment

J. W. Frost, M.D., Box 245, Waverly, Tenn.,
Director, Humphreys County Health De-
partment

Robert K. Harker, M.D., Bridgeport, Calif.,
Mono County Health Officer

Austin E. Hill, M.D., Dallas County Health
Dept., Dallas, Tex., Assistant County Health
Officer

Charles E. Kaufman, M.D., 328 Main St.,
West Haven, Conn., Health Officer of West
Haven

Lester B. Lougee, M.D., Marilla, N. Y.,
Health Officer of Marilla and Elena

Will J. Martin, M.D., Kokomo Clinic,
Kokomo, Ind., City Health Commissioner

Sumner M. Miller, M.D., 800 Peoria Life
Bldg., Peoria, Ill., Commissioner of Health

Wilbur J. Moore, M.D., Cheshire, Conn.,
Health Officer

Edwin L. Sheahan, M.D., St. Louis County
Hospital, Clayton, Mo., Deputy State
Health Commissioner

John U. Speer, M.D., Pulaski, Tenn., Director,
Giles County Health Unit

Harry G. Timbres, M.D., Box 45, Reedsville,
W. Va., Physician, Arthurdale Homestead
Subsistence Project

Arthur J. Wiesender, M.D., 736 Spring St.,
Berlin, Wis., City Health Commissioner

A. Evan Williams, M.D., Boyceville, Wis.,
Health Officer

Laboratory Section

Claude S. Bryan, M.S., Michigan State Col-
lege, East Lansing, Mich., Research Worker,
Bacteriology Department

Mary E. Caldwell, Ph.D., Box 4051, Tucson,
Ariz., Head of Dept. of Bacteriology, Uni-
versity of Arizona

Marion S. Campbell, 29 N. Hawthorne Lane,
Indianapolis, Ind., Senior Bacteriologist and
Assistant Chemist, State Division of Public
Health

John Grill, M.D., 561 N. 15 St., Milwaukee,
Wis., Director of Laboratories, Milwaukee
County Institutions

Lewis R. Hill, M.D., 500 Sunset Ave., La
Grange, Ill., Assistant Professor of Bac-
teriology and Preventive Medicine, Loyola
Univ. College of Medicine; Pathologist

Dorcas O. Hoge, A.B., 512 W. Second St.,
Grand Island, Nebr., City Bacteriologist

Elizabeth D. Robinson, 1179 Main St., Hart-
ford, Conn., Senior Laboratory Technician,
State Dept. of Health Laboratories

Helen C. Sayles, B.A., Dept of Health, New
Britain, Conn., Bacteriologist

Thomas F. Walker, Great Falls, Mont.,
Director of Laboratory

Vital Statistics Section

Alexander Fell, Tenaflly, N. J., Secretary and
Registrar of Vital Statistics, Board of Health

Louise Hopwood, B.S., 615 Dunkirk Rd.,
Baltimore, Md., Statistical Worker, U. S.
Public Health Service

Sara Kerr, B.A., 126 Pearl St., Buffalo, N. Y.,
Consultant in Statistical Work, City Dept.
of Health

Frederick F. Stephan, M.A., 722 Woodward
Bldg., Washington, D. C., Secretary, Ameri-
can Statistical Association

Lida J. Usilton, M.A., 1613 Harvard St.,
N.W., Washington, D. C., Associate Statis-
tician, U. S. Public Health Service

Jane Worcester, A.B., 55 Shattuck St., Boston,
Mass., Statistician, Harvard School of
Public Health

Public Health Engineering Section

John F. O'Donnell, 4007 Holmes, Kansas City,
Mo., Farm Dairy Inspector, Health Depart-
ment

Food and Nutrition Section

Reid R. Ashworth, D.V.S., 3533 Hertford
Place, N.W., Washington, D. C., Chief Food
Inspector, Dept. of Health

Jacob W. Forbes, State Board of Health,
Helena, Mont., Director, Food and Drug
Division, State Board of Health

Lloyd B. Jensen, Swift & Co., Chicago, Ill.,
Chief Bacteriologist, Research Laboratories

C. J. Pollock, 1301 Moreau Drive, Jefferson
City, Mo., City Dairy Inspector

Child Hygiene Section

Fairfax Hall, M.D., 421 Huguenot St.,
New Rochelle, N. Y., New York State
Medical Society Committee Public Health
and Medical Education

Arie M. Wetzel, R.N., 210 Chestnut St.,
Marietta, Ohio, Washington County Public
Health Nurse

Robert G. White, M.D., Ann Arbor Public
Schools, Ann Arbor, Mich., School Phy-
sician

Charles C. Wilson, M.D., 249 High St., Hart-
ford, Conn., Director of Physical and
Health Education, Board of Education

Public Health Education Section

William J. Burns, 4421 Woodward Ave.,
Detroit, Mich., Executive Secretary, Wayne
County Medical Society

William H. Frazier, M.D., Tuskegee Institute,
Ala., Medical Examiner, Negro Public
Schools

Violet S. Hoar, R.N., 353 W. 17 St., Holland,
Mich., Health Counselor, Allegan County
Health Unit

Edward W. Zukauckas, M.D., 1114 Foster
Ave., Brooklyn, N. Y., Medical Inspector,
New York City Dept. of Health

Public Health Nursing Section

Florence W. Englesby, R.N., 800 Capitol Ave.,
Pierre, S. D., State Supervisor, Child Health
Nursing Project

Betty Jones, R.N., Savannah, Tenn., Hardin
County Health Nurse

Gladys McGuire, 822-6 Ave. N., Great Falls,
Mont., County Tuberculosis Nurse

Lily Morris, 2912-3rd Ave. N., Great Falls, Mont., Supervisor of School Nursing
 Stella I. Mucha, R.N., 134½ S. Barry St., Olean, N. Y., Supervising Nurse
 Ann S. Nyquist, R.N., University of Minnesota, Minneapolis, Minn., Field Nurse, Division of Child Hygiene
 Mary M. Ownby, R.N., Box 174, Waverly, Tenn., Humphreys County Public Health Nurse

Epidemiology Section

Ralph K. Collins, M.D., Direction Generale de la Sante Publique, Sofia, Bulgaria, Field Director, Rockefeller Foundation
 B. A. Dyar, M.D., State Board of Health, Pierre, S. D., Epidemiologist
 Joseph C. Knox, M.D., M.P.H., State Board of Health, Raleigh, N. C., Epidemiologist
 Earl B. McKinley, School of Medicine, George Washington University, 1335 H. St., N.W., Washington, D. C., Dean and Professor of Bacteriology, Hygiene and Preventive Medicine
 Dr. Carlos Monge, Calle Trinidad 373, Lima, Peru, Head Dept. of Medicine, Military Hospital
 Hugh F. Stanton, M.D., C.P.H., State Board of Health, Phoenix, Ariz., Epidemiologist
 Franklin H. Top, M.D., C.P.H., Herman

Kiefer Hospital, Detroit, Mich., Medical Epidemiologist

Thomas B. Turner, Rockefeller Institute, New York, N. Y., Special Member, International Health Division, Rockefeller Foundation

Unaffiliated

Frederic W. Nordsiek, S.B., 386 Fourth Ave., New York, N. Y., Executive Secretary, New York Diabetes Assn.

Joseph Stein, Room 1111, 330 W. 42 St., New York, N. Y.

ERRATUM

ON page 713 of the June issue of the *Journal* (Recommended Procedure for Diphtheria Immunization), the first word on the 29th line in the first column should be *years*, not months, the phrase thus reading, "The toxin-antitoxin mixture less often causes reactions in children over 6 years of age, and in adults, than do the soluble and alum precipitated toxoid preparations, . . ."

H. E.

NEWS FROM THE FIELD

AWARD TO DR. CHESLEY

DURING the Conference of State and Provincial Health Authorities of North America held in Atlantic City, N. J., June 14-15, A. J. Chesley, M.D., F.A.P.H.A., of Minnesota, was presented with a certificate of award as State Health Officer of the state which had done the most to further the promotion of the Health Conservation Contests. The presentation address was made by Watson S. Rankin, M.D., F.A.P.H.A., Chairman of the Grading Committee of the Health Conservation Contest, on behalf of the Chamber of Commerce of the United States and the American Public Health Association.

At the time this award was announced by the Grading Committee special recognition was also made of the splendid interest being stimulated in the Health Conservation Contest by the New York State Department of Health. The success of these competitions is in no small measure due to the coöperation of state health officers all over the United States.

DES MOINES SURVEY

A BRIEF survey in regard to public health activities and organized care of the sick in Des Moines, Ia., was made recently by James Wallace, M.D., F.A.P.H.A., Associate Field Director of the American Public Health Association for the Community Chests and Councils, Inc.

BABIES HONOR DR. THOMPSON AT 100

MANY of the 1,800 babies he brought into the world during 75 years of practice thronged Main Street in Bethel, Ohio, on July 6, to celebrate

Dr. William Eberle Thompson's 100th birthday. The town weekly printed a special issue. The Ohio State Medical Association sent its president, Dr. John A. Caldwell of Cincinnati, to pay the respects of the profession.

Casting aside the honors, Dr. Thompson almost shyly called himself just an old-fashioned country doctor.—*New York Herald-Tribune*, July 8, 1935.

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION ELECTS OFFICERS

AT its annual meeting in March, the Northern California Public Health Association elected the following officers:

President—Dr. J. C. Geiger, San Francisco
President-Elect—Dr. E. H. Coleman, Fresno
Vice-President—Samuel H. Greene, San Francisco

Secretary—Dr. I. O. Church, Oakland
Treasurer—Helen Hartley, Stockton
Representative on the Governing Council of the A.P.H.A.—Leon B. Reynolds, Stanford University

ROTHSCHILD GIFT

ONE of her last acts of philanthropy before the Baroness Edmond de Rothschild died recently was the contribution of \$7,500 to Hadassah, the Women's Zionist Organization of America, to repair the Hadassah Hospital in Safad, Palestine.

The property of the hospital building was given to Hadassah by the late Baron de Rothschild shortly after the World War and is the only hospital for tuberculous patients in Palestine. In the last few years the condition of the building had become so bad that the hospital would shortly have had to be condemned as unsafe. Extensive

repairs are now possible. It will have a bed capacity of 55.

ROOSEVELT MEDAL AWARDED

WILLIAM HALLOCK PARK, M.D., F.A.P.H.A., Director of the Bureau of Laboratories of the New York City Health Department, will receive the Roosevelt Medal for the year 1935. Dr. Park receives the medal for distinguished service in the administration of public office.

The medal will be bestowed by the President of the Roosevelt Memorial Association as usual at a banquet at Roosevelt House, the Roosevelt birthplace, at 28 East 20th Street, New York, on October 27, the 77th anniversary of Theodore Roosevelt's birth.

The Roosevelt Awards, which were established by the Roosevelt Memorial Association in 1923, are annually given in certain fields associated with Theodore Roosevelt's career: public and international law; industrial peace; science; American historical literature; outdoor life; national defense; international affairs; administration of public office; conservation of natural resources; advancement of social justice; expression of the pioneer virtues; leadership of youth and the development of American character.

STATE AND PROVINCIAL AUTHORITIES

THE following officers were elected at the Atlantic City meeting of the Conference of State and Provincial Health Authorities of North America on June 15:

President—Dr. H. E. Young, Provincial Officer of Health of British Columbia.

Vice-President—Dr. Earle G. Brown, Secretary of the State Board of Health of Kansas.

PERSONALS

DR. GREGORY D. MAHAR, of the staff of the Syracuse Department of Health since 1923, was appointed

Health Commissioner of Syracuse, succeeding Dr. George C. Ruhland, who recently became Health Commissioner of the District of Columbia.

DR. ELMER G. BALSAM, of Billings, Mont., is the new President of the Montana State Board of Health, and Dr. Louis H. Fligman, of Helena, is Vice-President.

DR. NATHANIEL W. FAXON recently resigned as Superintendent of Strong Memorial Hospital, of Rochester, N. Y., to become Superintendent of Massachusetts General Hospital, succeeding the late Dr. George H. Bigelow.

FRANCIS E. FRONCZAK, M.D., F.A.P.H.A., was honored at a reception recently on his completion of 25 years as Health Commissioner of Buffalo, N. Y.

DR. GEORGE M. ANDERSON, of Cheyenne, has been appointed to the offices of Wyoming State Health Officer, Secretary of the State Board of Health, and Acting Secretary of the State Board of Medical Examiners, succeeding Dr. Walter H. Hassed, member A.P.H.A. Dr. Anderson held the position prior to Dr. Hassed's appointment in 1928.

GAIUS E. HARMON, M.D., of Cleveland, O., F.A.P.H.A., has resigned as Associate Professor of Hygiene and Vital Statistics at Western Reserve University, to become Chief of the Bureau of Epidemiology of the Chicago Board of Health.

C. C. SLEMONS, M.D., F.A.P.H.A., who has served under 3 governors as State Health Commissioner of Michigan, was reappointed June 26. His term would have expired July 1. Dr. Slemons was City Health Officer in Grand Rapids before he was appointed State Health Commissioner.

DR. CHARLES M. SIEVER, for 19 years head of the Student Health Department at Kansas State College, Manhattan, Kans., resigned as of August

31. Dr. Siever was formerly Health Officer of Jackson County.

DR. EDWARD J. SCHWARTZ has resigned as Assistant Health Officer of the District of Columbia.

DR. HERBERT SPENCER GASSER, Professor of Physiology and Director of the Physiological Laboratories of Cornell University Medical College, has been appointed Director of the Rockefeller Institute for Medical Research, succeeding Dr. Simon Flexner, who is retiring.

DR. RALPH S. MUCKENFUSS, Bacteriologist at Washington University, St. Louis, Mo., until July 1, has become temporary Associate Director of the New York Bureau of Laboratories. From 1925 to 1929 he was connected with Rockefeller Institute.

I. F. THOMPSON, M.D., F.A.P.H.A., Commissioner of Health of Racine, Wis., has been reappointed for another term of four years beginning Oct. 1, 1935.

DEATHS

DR. THOMAS McCRAE, Professor of Medicine at Jefferson Medical College, Philadelphia, Pa., since 1912, and for more than 22 years a consulting physician in Philadelphia, died June 30, at the age of 65. He was a fellow of the Royal College of Physicians of England, a member of the British Medical Association, and a past president of the Association of American Physicians. Dr. McCrae collaborated with Sir William Osler in writing *Cancer of the Stomach*; and also *A System of Medicine*, which he later abridged into the 5-volume work known as *Modern Medicine*. After Sir William Osler's death he edited the latter's *Principles and Practice of Medicine*.

RALPH HENDRICKS, M.D., Health Officer of Spokane, Wash., died recently. He was a member of the A.P.H.A.

DR. CLARENCE JOSEPH D'ALTON, of New Milford, Conn., retired nerve specialist of New York City, died July 12. He served under Dr. Thomas W. Salmon in the U. S. Army Medical Corps during the World War, and was active in the work of The National Committee on Mental Hygiene.

CONFERENCES

Aug. 8-19, Fifteenth International Physiological Congress, Leningrad and Moscow, Russia.

Aug. 9, 10, North Pacific Pediatric Society, Seattle, Wash.

Aug. 10-17, Meeting of Health Section of the World Federation of Education Associations, Oxford, England.

Aug. 22-23, Central States Section of the American Water Works Association, Pittsburgh, Pa.

Aug. 29-Sept. 5, First Annual Meeting, Latin American Congress of Physical Therapy, X-ray, and Radium, Mexico City.

Sept. 20-Oct. 2, 7th International Medical Post-Graduate Congress, to be held during the World Exhibition, under the auspices of the University of Brussels, Bruxelles-Spa, Belgium.

Sept. 30-Oct. 4, American Hospital Association, St. Louis, Mo.

Sept. 30-Oct. 4, 21st National Recreation Congress, sponsored by the National Recreation Association, Chicago, Ill.

Oct. 5-7, Conference of State Sanitary Engineers, Milwaukee, Wis.

Oct. 7-10, Sixty-fourth Annual Meeting of the American Public Health Association, Milwaukee, Wis. Headquarters: Hotel Schroeder.

Oct. 7-10, Annual Meeting of the American Association of School Physicians, Milwaukee, Wis.

Oct. 7-10, Meeting of the American

Association of State Registration Executives, Milwaukee, Wis.

Oct. 7-10, Meeting of the International Association of Medical Health Officers, Milwaukee, Wis.

Oct. 7-10, State Laboratory Directors Conference, Milwaukee, Wis.

Oct. 7-10, Conference of Wisconsin Health Officers, Milwaukee, Wis.

Oct. 8-11, Meeting of the Association of Dairy, Food and Drug Officials, Milwaukee, Wis.

Oct. 10-11, Meeting of the International Association of Dairy and Milk Inspectors, Milwaukee, Wis.

Oct. 14-18, 24th Annual Safety Congress, National Safety Council, Inc., Louisville, Ky.

Oct. 28-31, 18th Annual Meeting, American Dietetic Association, Cleveland, O.

Nov. 1, 2, School Health Conference, sponsored by the Department of School Health and Physical Education of the National Education Association, Philadelphia, Pa.

Nov. 15, 16, Sixty-first Annual Meet-

ing, New Jersey Health and Sanitary Association, Hotel Berkeley-Carteret, Asbury Park, N. J.

Nov. 19, 20, Annual Meeting of the Southern Branch, American Public Health Association, St. Louis, Mo.

Dec. 30-Jan. 4, 1936, Winter Meeting of the American Association for the Advancement of Science and Associated Societies, St. Louis, Mo.

July 27-31, 1936, Second International Congress on Mental Hygiene, Paris.

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AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

September, 1935

Number 9

Sanitation in the Holy Land*

ISADOR W. MENDELSON, F.A.P.H.A.

New York, N. Y.

IN the short span of 15 years, historic Palestine has emerged, from a war-torn, oriental country infested with malaria, trachoma, and other infectious diseases, as one of the very few prosperous sections of the world. The illuminating story of this remarkable metamorphosis is one of consistent progress in public health and sanitation matching economic development, step by step. Credit for this achievement is due the British Department of Health of Palestine, Louis J. Cantor of New York City who was its first sanitary engineer, and the Hadassah, Women's Medical Auxiliary of the Zionist Organization of America.

Before their retreat in 1917-1918, the Turkish Army, following the example of other armies during the great war, deliberately wrecked the country, ravaging the homesteads, and conscripting the population or sending it into exile, leaving behind the weak, the old, and the very young. The land was denuded of stocks of cattle and horses; orange groves were ruined by lack of irrigation; and cultivated fields were abandoned.

The war's depredations in Palestinian towns are mirrored in the harrowing experiences of Petah Tikvah. Forty years before, that inspired Joshua Stemper, who was loved even by his opponents, had walked from his birth-place in Hungary to Jerusalem and, though the son of a Rabbi and untrained as a cultivator, had founded the colony of Petah Tikvah. It developed splendidly under the Palestine sun, the transformation of every parcel of sand into bearing vineyards and orange groves arousing great joy among the educated but manually untrained young farm hands. Then came the war and the colony's tragic decline; the requisition of cattle and other possessions, and the ruthless cutting of trees by the Turks and the Germans to run their locomotives; the destruction of all crops by clouds of locusts making night of day; invasion by warring armies, twice by the Turks, twice by the English, and four times the scene of battle; the evacuation of the population and, finally, their return to empty houses in October, 1918. In the intervening months, the exiles were driven from place to place, sleeping in the open, sick and weary; their bodies unutterably filthy with sores and wounds; their every possession sold, lost, or stolen.

* Much of the foregoing information was obtained through the courtesy and assistance of Mrs. Cantor, the American Economic Committee of Palestine, and the Hadassah, for which the writer is deeply grateful.

In Jerusalem the Jewish population was in the most precarious position of all. Composed largely of old men and women devoted to study and prayer who had come, with insufficient funds, to spend their last days in the Holy City and to be buried on the Mount of Olives, scores died of sheer want after their monthly subventions from Europe and America were cut off by the war. Serious outbreaks of disease reduced their number still further, leaving weak and dispirited survivors. Their vicissitudes reduced the Jewish population in the city to 32,000 early in 1919, half what it was before the war, and among them approximately 1 in every 10 was an orphan.

Immediately following British occupation of Jerusalem on December 11, 1917, the Occupied Enemy Territorial Administration (O.E.T.A.) was organized, with military governors at Jerusalem and elsewhere; food was brought by military transport, and merchants were permitted to import goods from Egypt via the military railway. Among the most urgent tasks of the O.E.T.A. was the development of a Medical and Health Service in the country ravaged by war and decimated by disease. Few traces were found of any preëxisting government health service—in theory there existed under the Ottoman Code the outline of an organization which would have served the primary needs of the country, if in practice it had been adopted but, beyond the employment of part-time municipal doctors on small retaining fees, little was done. Within a year the new Department of Health, assisted by the Hadassah Medical Unit, and for a time the American Red Cross, established and actually conducted in nearly all the larger towns their sanitary services, instituted an epidemic and disinfection program, laid the foundations of an anti-malarial organization embracing all towns and colleges, and founded a central hygienic

laboratory at Haifa, with branch laboratories at the government hospitals in Jerusalem, Jaffa, Gaza, and Nablus.

To supplement government health and social activities, the English agreed to the despatch of a Zionist Commission to Palestine to form a link between the British authority and the Jewish population and to coördinate their relief work and other efforts; also, to the sending of an American Medical Unit by the Hadassah to assist their coreligionists with urgently needed medical relief. Such is the story of the official existence of the present activities of these groups in Palestine in assisting not alone Jews but also Arabs and Christians in the daily amenities of life, particularly medical relief and sanitation.

With the American Medical Unit of 20 doctors and 20 nurses was a sanitary engineer, Louis J. Cantor, chosen because of his anti-malaria experience with the United States Government in the Panama Canal Zone and destined because of his inspired, unflagging, zealous efforts in the face of innumerable difficulties to become the pioneer sanitation engineer of Palestine.

On August 8, 1918, the unit arrived at Jerusalem while the world was still at war. The sanitary engineer was at once assigned to the 123rd Sanitary Section of the British Royal Army Medical Corps for direct army control of anti-malarial work, scavenging, and food establishments in Jerusalem. Noting that the overburdened hospitals were filled with malaria patients and the city saturated with mosquito propagating cisterns and water receptacles, Cantor asked for and received 6, later increased to 12, Jewish soldiers of the 39th Battalion, Royal Fusiliers, as sanitary inspectors. He immediately instituted a thorough search for all mosquito-bearing water containers, and began their oiling to prevent the innumerable eggs from developing in

the embryo stages in the vitally necessary water. Garbed in their uniforms, invested with the authority of the British Army, and conversant with Eastern ways and languages, the inspectors sprayed cisterns, cesspools, drains, leaders, water-jars, overhead water reservoirs, and rain barrels in gardens with a special crude oil mixture provided by the unit. Cursed alike by the Arab and the Jew who did not want their sweet-tasting water fouled with the oil, and at times showered with water and over-ripe vegetables by irate householders, the inspectors stoically proceeded with their spraying. In the case of an old woman, this tumultuous greeting of the inspectors was replaced with a quiescence almost of welcome. Upon investigation the paradoxical situation was solved. After the inspector sprayed the surface of the water in the open cistern which in common with most others in the city had a rope and pail but no pump, the crafty woman inserted a cloth, sopped up the oil and squeezed it into a vessel. Later she fed the reclaimed oil to her kerosene stove which is universally used for cooking in Palestine. Despite similar rebuffs, the results of this campaign were immediate and astounding; the number of malaria deaths in the city decreased from 113 in the last 9 months of 1918, to 35 for the year 1919, and to 5 for all 1922. When viewed in the light that for each malaria death there are hundreds of malaria cases, the reduction in human suffering in Jerusalem can better be appreciated.

But oiling was expensive and had to be continued weekly. To exclude the female mosquito from the water, a movement was begun to persuade the householder to cement the top of his cistern and attach a hand pump. The few well-to-do did so at once, but the poor could not afford the expense involved. Cantor induced the Hadassah to purchase 10,000 hand pumps and



Laying sewer line in Meashorim

make them available for general distribution through the government at a nominal charge. This action proved of incalculable value. But there were still many who persisted in the customary use of the open cistern. At last it was necessary to resort to sterner measures. On November 16, 1919, a notice was published in the *Official Gazette* that—

The public water supply is only available for the Army, Railroad, Institutions, and necessary trades. Therefore, it is necessary for the public to use cisterns and maintain same with cover or pump in a sanitary condition on fine of £5 or imprisonment of one month; and the Military Governor, if he thinks fit, can have the work carried out and charge the expense to the owner or occupier.

Gradual enforcement of this order brought the desired results.

With his energetic sanitary inspectors, Cantor supervised the frequent collection of house, trade, market, and street refuse, loading it in bags atop donkeys—according to the practice of the ancients—hauling to dump grounds

outside the city and burning it in small incinerators. In cleaning up the Jewish quarters, relief funds were assigned through the Zionist Commission to provide work under Cantor's direction for the unemployed old Jews ranging in years from 40 to 70. At the maximum, 110 of these laborers were employed.

To overcome the carefree public custom of throwing garbage into the street oblivious of passers-by and at times spattering them, or dumping it in open kerosene tin cans, the Department of Health on Cantor's recommendation required the householder to provide suitable garbage containers. A model garbage can with cover was made and displayed in his office and throughout the city. This was followed by a campaign of persuasion resulting in their widespread installation. The public demand from all Palestine for garbage cans is now being supplied by a factory in Tel-Aviv.

The Hadassah Medical Unit was originally housed in the Baron de Rothschild Hospital at Jerusalem. Immediate renovation of this hospital and construction of additional service buildings was the first of Cantor's major assignments. A hurried survey of available means for this building project was disheartening and showed, in the words of Cantor's diary,

Labor available—old men and boys (able-bodied men in the army), no mechanics nor skilled workmen; materials—stone (badly dressed), lime (not burned), wood (not obtainable), roof tile (demolish buildings), water supply (cisterns, goat skins, and petrol tins), glass (priceless), paint (expensive), tin (use petrol tins), timber (dismantle old buildings); transportation—porters for lumber and glass, donkeys for sand and stone, camels for tiles and cement, wagons for lumber, cement, and stone, and automobiles for general duty.

But Cantor undaunted carried on. From the wood of the 1,883 cases of freight containing the Unit's supplies which arrived in September, chairs, tables, hospital shelving, and other

articles were made. Finding among his soldier inspectors one with a working knowledge of plumbing, he taught a few local tinsmiths—the only skilled laborers available—how to do simple plumbing operations. Masons and carpenters were developed to carry out his ideas. Supplies were obtained by dismantling old buildings, from the Unit's freight when available, by purchase from the British Army or the American Red Cross, or by personal trips to Cairo. From all this there was developed in a short time a completely renovated main hospital building having clinics and dispensary provided with modern hospital equipment, such as X-ray and disinfecting machines, and with water for a hot and cold system for baths, showers, lavatories, and sterilizers; latrines; a laundry building; a morgue; storehouse; garage; laboratory; nurses' home; and headquarters.

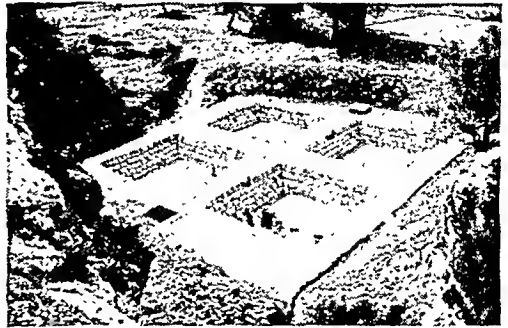
Next came the cleaning and renovation of existing Jewish hospitals, orphanages, schools, and other public institutions including Mikvehs or baths. To the consternation of the orthodox Jews, the bathing pools in the Mikvehs were treated by the inspectors with bleaching powder to destroy infectious germs, and bathers contrary to life-long habits were required to soap themselves and take a thorough shower before entering the pools. To show orthodox students that the clusters of long hair growing on their cheeks in the form of "payas" or side-burns and acting as dirt and disease-germ catch-alls could be maintained in a sanitary manner despite the religious prohibition against cutting them with a knife, Cantor grew them for a year and had them trimmed with scissors. Because of increasing public demand for modern plumbing and Cantor's persuasion and unfailing assistance, the local tinsmiths and hardware stores, within a year and for the first time in the history of Palestine, made available to the public the various

appurtenances known as modern plumbing. Today well equipped stores in Jerusalem and elsewhere in Palestine display the products of large sanitary supply firms of both Europe and America, and a factory in Tel-Aviv is manufacturing sewer tile.

At the same time that Cantor commenced his sanitary work in Jerusalem, Dr. S. M. Schmidt of the Unit originated similar work in Jaffa, all under the authority and supervision and with the coöperation of the O.E.T.A. The first operation was a house-to-house medical and sanitary survey which revealed the need for scavenging, inspection, distribution of insecticides, and rat and mouse traps, screening, and oiling of wells. About 1,600 wells were sprayed. After a considerable number of men had been trained as sanitary inspectors, including some for anti-malaria operations in Haifa, the Unit was charged with the sanitation of 10 military camps and billets, and was assigned by the Municipality of Jaffa to the inspection of cafés, bakeries, barber shops, and other public buildings. Latrines were set up for the use of the Egyptian labor corps employed by the O.E.T.A. In a few months the persistent oiling caused a great reduction in the number of malaria-mosquito infested places.

About the middle of October one of Jaffa's sanitary squads was sent to Tiberias to combat the outbreak of cholera which before its termination caused 60 deaths. The source of infection was the water supply from the Sea of Galilee on whose shore the town is located. The lake was polluted with street washings, direct defilement by persons defecating in it, bathing and fishing. Jugs and kerosene tins were filled with this water, which was practically the only supply at the time, and carried to the houses. In controlling the epidemic, the British fenced off the entire city shore line with a wire netting,

leaving but five stations for taking water. These were constantly protected against pollution. When a water carrier left one, a sanitary inspector placed bleaching powder in the container. Ten houses on the lake were evacuated to guard against pollution of the water. Empty lots were closed up, streets



Sewage treatment plant in Wady Joz

cleaned, and latrines and other nuisances abated. Anti-mosquito measures were adopted and carried through rigidly with the backing of the O.E.T.A.

Unfortunately, with the termination of the epidemic, the city resumed its ancient customs. An inspection by Cantor early in 1922 disclosed general sanitary negligence; the barricades to the lake had almost all been removed; the vacated lake houses opened; animals were being cleaned at the point of water supply; mosque latrines were emptying into the lake near the water pump; and the water was being taken at all points without any supervision. Action was quickly instituted to remedy these insanitary conditions.

Another sanitary squad was sent by the Jaffa Unit to Safed early in 1919. Schools, orphanages, and other public buildings were cleaned; necessary scavenging accomplished; houses and yards inspected; and cisterns oiled, sealed, and marked.

When Dr. Schmidt left the country in July, 1919, Cantor was placed in charge of all the Unit's sanitary activi-

ties in Palestine. Gradually, as trained personnel were provided for municipal sanitary services, the Unit's efforts were concentrated on sanitary improvements and anti-malaria activities in the Jewish agricultural colonies. Daily inspections were made of houses, yards, and water supplies of all the colonies, and a house-to-house educational program was conducted. In view of the large and increasing immigration through Jaffa, an immigrant delousing plant was established there. Immigrants were distributed among various labor camps whose sanitation was supervised by Cantor's inspectors.

In the meantime the O.E.T.A. through the Royal Engineer Corps made a health survey and census of Jerusalem. In the Jewish quarters this was accomplished by the government-loaned inspectors. With a view to installing a new system to improve the offensive sewerage conditions, cistern data were obtained, first for the northwestern section, and then the old or walled city. Certain cisterns would be used to flush proposed sewer lines, due to the inadequate city water supply.

Upon the survey's completion, Cantor was appointed sanitary engineer in charge of design and construction of the sewerage system for the northwest district, in addition to his other activities. The Zionist Commission donated \$50,000 for this project, and the O.E.T.A. granted \$10,000 for the treatment plant. Surveys were made, the system was planned, and the project presented to the city and O.E.T.A. for approval.

But at this point the scheme was almost defeated. When permission to purchase the land for the treatment works was sought from the Arab Mayor, he at first refused. His father and grandfather had lived in Jerusalem and had found a cesspit satisfactory, why should there be any change? Finally, approval was granted.

During its construction innumerable

difficulties were overcome. Supplies had to be purchased in Cairo and transported to Jerusalem. Skilled labor had to be procured. Arabs, the only workmen practised in the use of dynamite, were employed under an experienced Arab foreman in blasting a trench for the sewer pipe through the rock of the streets of the old orthodox Jewish quarter, Meashorim, meaning Hundred Gates. The 100 gates did not let in light or clean air, though. The streets were lean and crooked, the houses decrepit. The smells were of the vilest and most persistent.

Then followed a great religious controversy. True Arabs observe their day of rest on Friday, the orthodox Jews on Saturday. Not to lose time or money in construction, blasting was continued even on Saturday when Jewish services were being conducted. The Rabbis complained bitterly, to Cantor most of all, for he was in charge. But he could not delay the work, the funds were insufficient to provide for the extra expense involved. So the Rabbis solemnly proclaimed "Herem" (Hebrew word meaning outcast of the community), thereby excommunicating Cantor who was of their faith, forbidding God-fearing Jews to have anything to do with him. It was not until a year later, after the system was working and the offensive drainage conditions had been removed, that the Rabbis and the whole district publicly acclaimed Cantor for this achievement.

So the work progressed, the treatment plant was installed, and the completed project was turned over to the Municipality of Jerusalem in an official ceremony on November 12, 1920.

Somehow the troubles did not cease. Because the funds were inadequate and the works were to be temporary, until the large city sewerage scheme was perfected, the treatment plant was placed in the Wady Joz. This location was just below the hill on which were some

fine residences including the Mayor's and several English officials'. Complaint of offensive odors from the treatment plant ascribed to poor construction was lodged with the Mayor. He in turn complained to the British Government, making of it a political issue, to the effect that the Jews were trying to poison the Arab neighborhood and were creating a nuisance involving the spread of disease. So persistent and so influentially pressed was this complaint that the matter became a government issue. The government requested of Egypt that a sanitary engineering expert be sent to Jerusalem to investigate the situation. This was complied with and the sanitary engineer in time made the investigation and reported that the treatment works should be located farther down the valley. But money was not available for this; so the plant has remained in the same spot to this day. However, with the construction of the larger drainage system begun in 1932, the temporary works will be replaced by an adequate plant in the Valley of Kidron.

At present the only rivulet at Jerusalem is the effluent flowing from the sewage treatment plant in the Wady Joz. Strange to say, Arab women who enjoy picnics hold these functions beside this stream where it passes through the valley of olive trees and vegetable gardens.

Another example of the insanitary conditions under which the people of Jerusalem lived at the time of the O.E.T.A. is furnished by the memorable experience with the greatest snowfall in the city in 40 years. On February 10, 1920, there began a snowstorm without let-up until the 13th. More than 4 feet of snow fell. No one left his house the first day. On the next Cantor, knowing of the sick and poor in the Jewish quarters and the damage that would follow when the melting snow would flood the lowlands, en-

deavored to enlist help from the Rothschild Hospital. However, the attendants who were orthodox Jews refused to assist in removing the snow. They said they could not remove what God had sent from Heaven, it would be sacrilegious. But the doctors saw the need and cleared paths through the snow from different pavilions of the hospital. Cantor was placed in charge of relief work by the Unit. Doctors were assigned to various districts to visit the sick. Finding the bakery closed and without flour, Cantor asked the Governor for and obtained the loan of animals from the Department of Health, purchased flour, brought it to the baker, and then distributed the bread to various snowbound houses, using the willing Maccabean youths with donkeys. From the British Army he obtained soldiers to clear paths in the snow.

The snow was so heavy that the overburdened roofs of the Unit Nurses' Home and many other houses collapsed. All night long on the 12th, the doctors worked the pumps at their home and the hospital discharging water from the overflowing cisterns beneath the dining rooms to prevent flooding of the buildings. Snow was removed from house roofs. Weakened buildings were braced. Dwellers in low sections which might be flooded were moved to higher sections and temporarily housed. By the 14th paths were extended to the main streets, ditches opened for the melted snow water, families rescued from falling buildings, and a thorough canvass made of the districts, using the men and horses obtained from the O.E.T.A. On the next day, Sunday, with the snow generally melting, the city was subdivided into districts, 43 pumps with crews assigned for emptying overflowing cisterns, and labor gangs designated to help the sufferers, reinforce the weakened buildings and demolish dangerous dwellings with ropes. Over 100 workers cleared the

debris in the old city where some buildings collapsed in the week following the snow storm, killing several occupants. In this manner the great storm passed, leaving comparatively little public suffering and flooding of buildings in its wake.



Street of Prophets under snow, Jerusalem

Other activities of the indefatigable Cantor in the first 2 years may be likened to the development of an army to combat disease, including the training of chauffeurs in the hospital garage and of sanitary inspectors; conducting evening technical courses for developing draftsmen, foremen, and surveyors; and operating an employment agency and relief department for the Unit.

With the installation of the British Civil Administration on July 1, 1920, Cantor was appointed Sanitary Engineer of the Government Department of Health in recognition of his achievements. Without an office or furniture except for a table, he borrowed a chair and some paper and outlined his organization for the Sanitary Section. In time this included an assistant sanitary engineer, a draftsman, plumbing and sanitary inspector, a clerk, and a Museum of Sanitation. Its multiple activities included anti-malarial measures; sanitation of all government and public buildings; preparation of plans for model dairies and food establishments of all kinds; coöperation with municipal and village governments in

water supply, drainage, scavenging, and supervision of trades and industries; and general dissemination of sanitation information.

One of the first accomplishments of the new Department of Health was the appointment of a permanent Anti-Malarial Advisory Committee in September, 1920. For centuries malaria had decimated the population and barred the development of large tracts of fertile land. At times it assumed epidemic magnitude wiping out in the space of a few months the populations of whole villages. Few regions in Palestine were wholly free from it before the war. Every autumn hospitals in Jerusalem and most of the other towns were crowded with malaria patients. Anti-malarial government measures were carried out by the Sanitary Section. Necessary funds were provided and other assistance was rendered by a Survey Section of the International Board of Health and the Malarial Research Unit of the Jewish Joint Distribution Committee.

The Rothschild Foundation drained the Kabbara swamp between Jaffa and Haifa. Jewish agricultural colonies and towns drained nearby marshes and pools. Wells were covered. By 1925, more than 105 miles of drainage canals and ditches affecting 5,574 acres had been constructed, and 45,000 wells, cisterns, and cesspits were being oiled regularly. The malaria mosquito had disappeared from all the large cities except Haifa, and new cases of malaria were rare in them. A vivid picture of the transformation accruing from these efforts in the important Valley of Esdraelon is given by Sir Herbert Samuel, first English High Commissioner, in the following words:

When I first saw it in 1920 it was a desolation. Four or five small and squalid Arab villages, long distances apart. . . . For the rest the country was uninhabited. There was not a house, not a tree. . . . The River Kishon, which flows through the valley

and the many springs which feed it from the hillsides, had been allowed to form a series of swamps and marshes, and, as a consequence, the country was infested with malaria. Since then, 20 villages have been founded with a population numbering 2,600. . . . All the swamps and marshes have been drained, and cases of malaria are proportionately rare. The wooden huts of villages . . . the plantations of rapidly growing eucalyptus trees . . . fields of vegetables or cereals cover many miles of land.

Today in most Palestinian cities malaria has been brought under control by the Department of Health. Persistent drainage measures have practically conquered the disease in Jewish and neighboring Arab villages, while in non-Jewish areas (Acre, Huleh plain, and the region east of Beisan) malaria is still rampant. In rural and certain urban communities, much remains to be done.

Through efforts of the Department of Health, a Town Planning Ordinance was passed in 1921 establishing a Central Town Planning Commission to supervise new building construction in town areas. These buildings were to be provided with approved types of sanitary facilities. Under this ordinance, local town planning committees were formed in Jerusalem, Jaffa, and other cities. Model sanitary by-laws prepared by the sanitary section were approved by the commission for adoption by the cities, and a model plumbing code similarly prepared was published in the three official languages—Arabic, Hebrew, and English—by authority of the Commission.

Finding unsatisfactory plumbing installations being made by tinsmiths, locksmiths, and blacksmiths, due to the great scarcity of qualified plumbers, Cantor established a plumbing course in Tel-Aviv in 1926. At its conclusion, an examination was held. Thirty-five qualified to practise as plumbers, and 60 men were classified as assistants. Because of its success it was established as an annual institution. Similar courses were given in Jaffa in 1928 and

in Jerusalem and Haifa in 1930. In 7 years, 85 candidates were awarded certificates to practise as plumbers. For instructing classes in plumbing at the Haifa Technical Institute, Montefiore Technical School in Tel-Aviv, and the new Y.M.C.A. in Jerusalem, syllabi and sets of drawings of standard sanitary installations were provided. Defective plumbing material foisted on the country at the beginning was gradually replaced. So much good resulted from these efforts, that the Director of the Department of Health in 1929 stated:

The training and examination of plumbers undertaken by the Sanitary Engineer of the Department has had considerable influence in the improvement in house drainage.

An interesting experiment in social hygiene and domestic medical education was successfully encompassed in the first Palestine Health Week, November 23–30, 1924. The idea originated with the Hadassah which bore all expenses, was fostered by the Government,



Part of sewage treatment plant showing screens for removing coarse floating matter

and assisted by 25 leading local groups. Through the Government Department of Education, teachers talked in 716 schools in 353 cities, towns, and villages, on the daily health topics—Health, Baby, Food, Microbe, Recreation—and distributed pamphlets in Arabic and Hebrew to the pupils. Lectures and demonstrations were delivered at meetings of parents. A contemplated Prize Baby Competition was cancelled because of the superstition prevailing among mothers that personal exhibition of their babies would work to their physical harm.

A Health Exhibition to exemplify by demonstration and models the lessons indicated by Health Week was opened in Jerusalem on November 17, 1924, by the High Commissioner and visited in the 2 following weeks by no less than 34,090 people, including 4,830 children, an extraordinary attendance mark for a city of 65,000. The Government loaned the Sanitary Engineer, as Chairman of the Exhibition Committee, and his staff for 3 weeks to prepare and supervise the exhibition material. The Department of Health assisted in furnishing demonstrators in charge of several of the 14 sections and loaning equipment, including a complete mobile unit for combating disease epidemics. A special Harem Day was designated for Moslem women when only women demonstrators and guides were present. Many attended, lifting their veils and touching the exhibits, being deeply impressed through such physical handling.

Early in 1925 at the request of the Zionist Commission, the Department of Health sent Cantor as its representative on their committee to advise on the sanitation of all Jewish colonies in the Emek Valley. Many insanitary conditions were found, particularly the privies. Various improvements were recommended in a private conference with the colony leaders. Despite the

seeming fact that Arabs were immune to certain infectious diseases and Jewish immigrants not, these recommendations were not acted on. It was claimed they would prove a hardship on the colonies, were not required of the Arabs by the Government, and would be unfair. That summer a severe outbreak of typhoid fever occurred among these colonists, causing 192 cases and many deaths.

From the very beginning of the British occupation, water was scarce in Jerusalem, despite the 5,300 cisterns. To provide sufficient drinking water for the army, a pipe line was laid for over 13 miles, from Solomon's Pools to the city. Still the supply was insufficient. In 4 months the British Army Engineers rehabilitated the old unused aqueduct constructed by Pontius Pilate and brought water through its 40 miles of winding conduit from Ain Arrub springs. As abnormally low rainfalls decreased the supply, in 1923 water was transported by motor lorry from Nablus and other towns. Dirty Arabs peddled water from donkeys laden with six 4 gallon kerosene tins filled at the large cistern in the sacred Haram Sharif Area, charging 25 cents per tin. Those unable to pay these exorbitant prices waited patiently in queues at neighborhood standpipes from early morning until the special attendant's arrival to obtain the two tins of 8 gallons allotted each family every 2 or 3 days at a cost of 1 cent for 4 gallons. Only those possessing a ticket obtained from the Municipal Government showing the number of members in a family were provided with this water. The fee was used to pay the attendant's salary, there being a number of them who for one hour during the appointed day turned on the water from a neighborhood standpipe.

To relieve the sorely pressed city further, the Government in May, 1925, passed the Urtas Spring Ordinance to provide water from the Arab spring of

Urtas Village for a temporary period of 12 months by the construction of suitable works and pipe lines to Solomon's Pools. The city took only part of the water from this spring, the villagers having more than sufficient for their limited domestic wants and for irrigating their apricot orchards, vineyards, and fields. Compensation was made by the city on account of complaints of the villagers of possible damage to their crops from such diversion.

Nevertheless the ordinance proved a great shock to the villagers. They claimed the spring was theirs, and no one had a right to usurp their property. They said the water was taken for Jewish building purposes in Jerusalem, and pointed to the large amount of building in progress at the time to substantiate this accusation. The Executive Committee of the Palestine Arab Congress sent a long communication of protest to the Secretary of State for colonies in London. The inhabitants of Urtas brought suit to restrain the Government from using the spring. They claimed the ordinance was void because it failed to respect Arab rights guaranteed by the Mandate. The case came before the Supreme Court of Palestine. The Court held the ordinance repugnant to and inconsistent with the Mandate, because it failed to safeguard the civil rights of all the inhabitants, and declared it invalid. Appeal was made by the Government to the Judicial Committee of the Privy Council which reversed the Court's decision regarding the specific situation, holding that "there is no suggestion that any such discrimination is to be found in the Ordinance now under consideration."

The rainfall proving inadequate in 1926, water was hauled by train from Lydda. In later years additional supplies were piped from nearby springs, Ain Farah, Ain Fawar, and Wadi Kelt, but to little avail. The rapidly growing



Scavenging cesspools—June 8, 1919, at Orphan Relief Department. Insanitary nuisance to be replaced with Merryweather vacuum collection system.

population and low rainfall were too much for the available supplies. Finally, in accordance with the recommendations of the Municipal Water Department, concurred in by the Department of Health, a new supply from Ras-el-Ain springs at the head of the Auja River north of Jaffa was approved, money provided, and construction of the necessary pipe line and pumping stations begun in 1933. This water will be pumped 37 miles and raised 2,635 feet at a cost approximating $1\frac{1}{2}$ million dollars, and will be sold to the public at the comparatively high price of 10 or 11 gallons for 1 cent (in New York City the householder pays that for 80 gallons).

It was Cantor's practice when finding insanitary conditions in cities, to try out remedial measures in Tel-Aviv or elsewhere. When they were successful, he would endeavor to have the Department of Health adopt them for the country. Gradually, as a result, the cities undertook, with municipal funds, such sanitary services as giving way to a and maintenance of a of structure, with and equipment, street, the architectural drainage and water ple were adopting a partment of Health of view. posed to past prac, allpox had become a tracts for scavengi

pal services. All such sanitary services were inspected regularly whether in towns or villages. However, to insure more constant supervision in the larger cities, Cantor recommended the appointment of Municipal Surveyors. This was approved by the Government, and Municipal Surveyors were provided in Jerusalem, Haifa, and Jaffa. In Tel-Aviv this supervision was arranged for through a qualified plumbing inspector. For villages his recommendation of the appointment of a Local Council to supervise sanitation was adopted, and several such bodies were designated.

Finding that trade and industrial establishments were increasing rapidly without due consideration of sanitary principles, the sanitary section worked for a law to provide necessary safeguards. In 1927 an Ordinance for Licensing and Control of Trades and Industries was enacted with general supervision over its application vested in the Department of Health, more specifically, the Sanitary Engineer's Office. Before a new building coming under this classification was erected, the plans were laid before this Office for approval as to structural, safety, and sanitary provisions. Before it was placed in operation, it had to receive such approval again, always after a personal inspection. In the case of a cinema in Jerusalem, the builder complained because of the requirement of providing a suitable number of separate closets for men and for women. He stated his theatre was not for that purpose and that the requirement was more stringent than in Paris. In due time, he was persuaded as to the desirability of the requirement.

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Similarly, the Sanitation Section instituted activities tending to provide good water and drainage facilities and cleanliness in public restaurants, hotels, and other food establishments. Such efforts were directly reflected in the decrease in dysentery cases in Petah Tikvah from 63 in 1927, to 13 in 1930. The Director of the Department of Health, referring to this work, said in 1930:

The control of drainage, ventilation, and sanitary conditions in hotels, restaurants, and cafes, which, in so many countries in the East are the source of disease, has reduced to a minimum the apprehensions of tourists and visitors who are so important a source of the revenue of the country, and has developed in the proprietors and their local clientele a sense of cleanliness and hygiene unknown a few years ago in Palestine. The department has little difficulty now in obtaining reasonable sanitation in old establishments, and a high standard in new. The people themselves are beginning to demand it.

NOTE: Louis J. Cantor, whose work in Palestine is described in this paper, died there on January 8, 1933. That he was the father of sanitation in the Holy Land, no one can deny. Colonel Herron, Director of the Department of Health, summed up Cantor's achievements at the time of his death in these words: "His wide and accurate knowledge of a great variety of subjects dealing with Public Health have been of the greatest value in guiding developments in Palestine on correct lines.

"His splendid work is reflected especially in the very remarkable improvement in the plumbing, drainage, and sanitary installations in private and public buildings and in trades and industries, which has been such a feature throughout Palestine and which has so effectively reduced the incidence of preventable diseases. His achievements will live after him."

School Health Problems Through the Years: Boston Public Schools 1635-1935

JOHN P. SULLIVAN, PH.D., F.A.P.H.A.

Supervisor of Health Education, Boston School Department, Boston, Mass.

THIS year is of historical significance in the educational world since it marks the 300th anniversary of public school education in America. Here in Boston in the year 1635, only five years after the landing of the Puritans, Boston Latin School was founded. As Supervisor of Health Education, I was particularly interested in the health history of the Boston Public Schools through the years. An intensive study of the original records brought to light some very illuminating points on health.

The evolution of the Boston Public Schools from the first simply constructed building in which the Puritan scholars of early Boston assembled to study Latin and Greek, to the imposing modern structures, is replete with many examples of the progress made in safeguarding and supervising the mental and physical welfare of the pupils. In fact the progress made closely parallels the improved mortality and morbidity status of Boston.

The first two centuries of Boston's growth saw but few schools and a comparatively small school population. From 1635 with an enrollment of 75 scholars,¹ to 1700 with a school population of approximately 320 scholars assembled in 3 buildings,² the school system grew, until 1800, when there were about 1,100 scholars housed in 7 structures.³ The present system comprises over 325 school buildings with

an approximate enrollment of 140,000 pupils, a school enrollment larger than the total population of one far western state.

For the first three-quarters of a century, school work consisted chiefly of stressing the classics so that the young scholars might be acquainted with the Scriptures in the original. Very little attention was given to the hygienic conditions of school surroundings or the physical welfare of the scholars. Most attention was given to the imparting of knowledge rather than the conditions under which the knowledge was imparted. The general welfare of the citizens and pupils was in the hands of the Selectmen.⁴ It is of general educational interest to know that the first public health officer in Boston was Paul Revere.⁵

Keeping the footpaths free from refuse, fear of fire, and the pestilence, as smallpox was called, were the real community health and safety problems confronting the Selectmen of Colonial Boston.⁶ But about 1700, the Town of Boston was outgrowing its village atmosphere; streets were beginning to replace footpaths; the first rudely constructed homes were giving way to a more substantial type of structure, with a semblance of some architectural design; and the people were adopting a more social point of view.

Meanwhile, smallpox had become a

major health problem. Epidemics were becoming frequent. In desperation, the Selectmen issued an order on March 9, 1729, encouraging inoculation against this pestilence.⁷ This order did not seem to carry much weight with the parents of the school children or the citizens in general, for the warning was not heeded. A heavy outbreak occurred in 1752, and nearly 1,800 persons moved out of the town to escape its wrath.⁸ Immediately the question of inoculation was revived, and for a short time there was a hospital for this purpose on Noddle Island in Boston Harbor. But memory is short lived, and soon settlers flocked to Boston in such numbers that in the second decade of the 19th century (February 23, 1822) the town government had given way to a city form of government.

Shortly after this event we find the first official attempt to use the schools to overcome disease problems. In 1827, the school committee voted the first compulsory vaccination regulation for school children, which directed the master "to ascertain by probable evidence that every child who is offered for admission at school, shall have been secured against contagion of smallpox. And no child not so secured shall be received unless the school committee shall order such child to be received."⁹ The theme of this regulation is now found in some 16 state laws on vaccination.¹⁰

EARLY SCHOOL BUILDINGS

The early school buildings were simple structures, usually of wood, and devoid of architectural style. The interior arrangement of the school was vastly different from a modern building. The classroom was one large room with all classes assembled together. There were no blackboards, no maps, no pictures, nor were there window shades. There were neither extra rooms for recitation nor even special closet space for

clothes; these were later improvements.

The desks, with compartments for quills and books, were made of rough boards and the seats were without backs, so placed as to face the light. It was not until years later (about 1720) that an enterprising master concerned with the visual welfare of the scholars considered turning the benches around so that the light might come from behind. Then we waited a century and a half for the appearance of the commonly accepted "left hand" theory of light from the rear and over the left shoulder.

Garments and storm accessories were hung on tiers of hooks between the windows. The streams from the wet clothing ran along the floor and provided amusement for the scholars, and worry for the master, as the scholars tried to keep their feet above the water. The offensive schoolroom odor caused by the drenched clothing was a stormy-weather problem, particularly as there were as many as 100 to 200 pupils in each classroom.

There were neither bells nor radio to give the "No School" signal. Waterproof garments or rubber boots were unknown. The favorite foot protection was a pair of adult wool yarn, home-knit stockings drawn over the shoes.

The most important part of the school, at least during the summer season, so the scholars thought, was the old wooden pump. As it was generally located at the rear of the building, it was a familiar sight with its inviting dippers. Its constant use by the passing public created a problem for the masters. And in the period following the Revolutionary War we find in the records frequent complaints to the authorities as to "the evils arising from the free use of the pump, belonging to the schools."¹¹ This problem was solved by each pupil carrying his own drinking cup. On the final day of school it became customary for the

members of the last class in Latin School to celebrate their departure by kicking around their pails and cups until they were unfit for further use.

FIRST SCHOOL HEALTH SURVEY

The hygienic and sanitary conditions of school buildings did not receive any extensive consideration until the early part of the 19th century. In the year 1833 appeared the first survey of school conditions.¹² The school committee made a study and submitted recommendations concerning the physical properties of schools with reference to proper seating, heating, ventilation, and cleanliness. This report was unique for the times, as it stressed the relation of healthful and convenient places of instruction to mental success. The report of this survey with the suggested improvements was appropriately called "the charter of pupil welfare in public schools."

The beginning of the more modern type of seating began about 1842, following a petition of numerous parents, complaining of "the ever increasing prevalence of diseases of the spine among young females owing to the peculiar construction of the seats in which no support is provided for the back, and praying that an alteration of the seats may be made so as to remedy the evil complained of."¹³ This petition was followed by the further complaints that most of the desks were from 3 to 4 inches too low. The school committee corrected this evil by the purchase of a newer type seat and also prepared regulations as to the correct method of adjustment.¹⁴

Proper seating in relation to lighting came to the front after the Civil War. In 1876 the school committee originated and supervised the changing of desks and chairs for "left hand light" or to admit the light from the left of the scholars.¹⁵

The introduction of window curtains

"shades" in the latter 19th century was the first approach to the relationship of proper window lighting to visual health. Whether it was for economy or other reasons is not gleaned from the records, but window curtains were first installed in 1887 only on the southwest side of school buildings.¹⁶ The health value of proper window curtains is attested to by all educators today.

The first artificial light was gas, introduced in 1870 "into those rooms in school buildings which are not suitably lighted."¹⁷ However, gas was not generally used in the classroom to supplement the natural light. Its use was confined chiefly to dark hallways and basements.

The introduction of electricity in 1891, marked the beginning of artificial light to supplement daylight in the classrooms.¹⁸ The growing emphasis placed on the visual welfare of the pupil, the use of the school building as a civic center, thus necessitating lighting for evening sessions, construction of schools among tall buildings cutting off the unobstructed sky, thus making the natural light inadequate at many times, are the reasons why artificial lighting has become an essential part of the modern school building.

HEATING AND VENTILATION

Heating and ventilation soon followed the seating phase of this first survey. In the evolution of heating systems from fireplace to oil burner there have been many changes.

The school fireplace gave way generally to the Franklin stove after the Revolutionary War. This stove was invented in 1744 by Dr. Benjamin Franklin for burning wood, in which he introduced the principle of heating the air by means of a double or hollow back. It was in the form of an oblong box with the front removed. The smoke escaped over the top of this flat chamber, and passed downward be-

tween it and the real back of the stove, and then into the chimney. This hollow chamber communicated underneath the stove with a tube opening into the external atmosphere, and a quantity of air thus passed through the flat chamber and into the room through small holes left in the sides. Here appears the first attempt to construct economical stoves combined with the principle of sanitary heating and air supply to enclosed rooms.¹⁹

Furnace heat was generally introduced at the turn of the 19th century. The hot-air-furnace system was the first to emerge from the era of closed stoves.²⁰ It was not until after the Civil War that steam heat was commonly introduced.²¹ As early as 1846 there were printed rules and regulations "relative to the use of stoves, furnaces, and ventiducts in grammar schools."²² Later in the same year the school committee considered the subject of ventilation of school houses. The outcome was an experiment in three buildings with "such apparatus as may be required to secure proper ventilation in winter and summer and make such alterations and arrangements of the furnace as may be required."²³ This experiment was really the beginning of modern ventilation in school buildings.

That the school committee considered this heating and ventilation problem serious may be gathered from the happenings of the next year. In 1847 the committee conferred with the architects and builders on all new school buildings. In addition a report was forwarded to the mayor, aldermen and council demanding that the suggestion of the school committee concerning heating and ventilation be adopted. This report to the city officials was followed by a special order to the masters and teachers containing very definite rules on ventilation.

Again in 1862 the question of ventilation "without draft or current of

air" came to the front.²⁴ Then followed Robinson's and Main's systems which employed portable window ventilators, and they enjoyed popularity for some years. In 1886 the school committee on its own initiative supplied ventilating window boards on all windows of school rooms. At this period also, all radiators were guarded by screens. The first radical departure from the open window system was the Eureka ventilators, first installed in 1887. From then to the present day the field of school ventilation has seen many systems. In the last half-century, since the memorable report of the city architect in 1891 on all heating and ventilating systems, which listed those which fulfilled the requirements of statute, we have seen a gradual departure from the natural methods utilizing windows, doors, old-fashioned shafts in the walls connecting with the attic, and small apertures through the external walls of the classrooms to the modern varied modifications of the mechanical systems. In the recently constructed school buildings the school ventilating engineer has found most feasible a combination of direct radiation and mechanical means utilizing the unit ventilator.

To aid the teacher to participate better in classroom hygiene, thermometers were generally placed in the classrooms in 1885.²⁵ This device has served to make a more uniform temperature in the classrooms and to enable the teacher to keep the acceptable standard of "as near sixty degrees Fahrenheit to sixty-seven degrees Fahrenheit as possible."²⁶

SANITATION OF SCHOOL BUILDINGS

Sanitation of school buildings forged to the front toward the close of the 19th century. This interest closely paralleled the movement for preventive sanitation in the field of public health which included the period from 1885

to 1910. This interest in preventive sanitation prompted the law passed in 1888 relative to "sanitary provisions and proper ventilation in school houses." This law was the aftermath of two surveys, carried on independently by the Boston Board of Health under Dr. S. H. Durgin, and the Massachusetts State Sanitary Police under R. F. Wade, complaining of the unsanitary conditions and also the poor ventilation of most school buildings.²⁷ The following year a special appropriation of \$50,000 was made for sanitary improvements of all school houses.

Elimination of nuisances near school houses was the first extraneous problem. Stables alongside one school, and a house that was a contagious-disease problem nearby to a second, were some of the nuisances corrected. The early school sanitary problems were concerned mainly with outbuildings. The old-fashioned vaults of outbuildings demanded that the cess-pools be cleaned during the summer vacation. In 1889 there was a replacement by water vaults. With the innovation of the water vaults, a few schools experimented with the toilet facilities in the basement of the school buildings. However, when the Board of Health, in a survey of 1889, objected to this procedure on the ground of poor ventilation of toilets, it was halted temporarily. In the same year the old wooden urinals were replaced by stone and glass with the urinals partitioned off. Considerable attention was also given to the ventilation of the water-closets.

Shortly after, with the appearance of improved facilities, toilets were gradually introduced into the basements of the newer buildings. This gradual transfer of toilet facilities has continued until today no school building has facilities outside the protection of the main building. The modern plumbing improvements (fountains, etc.) make the school buildings of today a

decided improvement over those of two centuries ago.

Until the opening of the Cochituate water line, most schools depended for their water supply on nearby wells. However, after 1848 when the Cochituate water was brought to Boston the schools were generally piped for water.²⁸ Water filters were the first experiments connected with this improvement. Today sanitary bubblers are found in all buildings. Hot and cold water satisfy the handwashing needs of the pupils.

SCHOOL MEDICAL PROBLEMS

Toward the end of the 19th century the school committee, realizing the tremendous importance of school-health problems, considered creating the office of medical inspector of schools to supervise all matters pertaining to sanitary conditions, including measures for prevention of the dissemination of contagious diseases. However, the city solicitor ruled in 1876 that the school committee could not spend funds for that purpose.²⁹

Four years later, in 1880, the school committee again attempted to solve this problem by creating the office of instructor in hygiene. Again the city solicitor ruled against his performing the duties of medical inspector, although he could legally instruct in the normal and high schools.

Undaunted, the committee continued to urge this type of position. Finally, the office of instructor in hygiene was legally established in 1885 and continued until 1890.³⁰

An interesting contrast in the methods of handling school epidemics in the 19th and 20th centuries is seen in one of the early decisions of the instructor in hygiene. Owing to the prevalence of scarlet fever among the pupils of one of the primary schools, the school committee closed the building from January 22 to February 1, 1886, on advice of the instructor in hygiene.³¹ This is the

first instance of official closing of school due to an epidemic.

Another example of the school committee's attitude toward safeguarding the welfare of the pupils, and particularly the precautions taken against the spread of contagious diseases, was given in 1881. A house in which contagious diseases had spread was in proximity to a primary school building. The committee, considering it to be a nuisance and a menace to the pupils, allotted funds to buy a vacant lot nearby. The house was moved and the menace also, as well as allowing the school a better exposure to sunlight.

The well founded belief that the school furnished a medium for the spread of contagious diseases, especially diphtheria and scarlet fever, prompted the Board of Health, in 1887, to advise the school committee to provide for the frequent fumigation of the school houses throughout the city, in order to assist in preventing the spread of contagious diseases.

It was not uncommon for the Board of Health to issue the rule that "all the public school houses in the city be fumigated as often as once in each 2 weeks during the cold season; the work to be done by the janitor on Saturday burning 2 pounds of sulphur to each 1,000 cubic feet of space."³²

In 1894 the first organized system of medical inspection of schools was established by the Board of Health, which had at that time full jurisdiction over school health problems. Eighty physicians were assigned to visit daily the assigned schools.³³

Boston was again the leader in handling school health problems by establishing the position of director of school hygiene in 1907.³⁴ The physical and hygienic activities of the system were merged into one department. In

1912 women physicians were added to examine girls.³⁵ In 1915 the school physician and medical problems were detached from the Board of Health and assigned to this department under the school committee.³⁶ This department under the supervision of the school committee still continues to supervise the physical welfare of 140,000 pupils.

REFERENCES

1. *Boston Records*, II, 5. i.e. Reports of the Record Commissioners of the City of Boston.
2. *Ibid.*, VIII, 2:101, 113.
3. *Boston School Committee Minutes* (1792-1814) p. 91. (Records from 1792 to 1869 found only in original longhand of secretaries of School-Committee. Not available outside Administration Library of Boston School Committee.)
4. Winsor, J. *The Memorial History of Boston*. James R. Osgood and Company, Boston, 1885, Vol. I, p. 388.
5. *Boston Records*, XXXIII, 6.
6. *Ibid.*, VIII, 15.
7. *Ibid.*, XII, 14.
8. Drake, S. *History of Boston*. Luther Stevens, Boston, 1856, p. 632.
9. *Boston School Committee Minutes*, 1815-1836. p. 219.
10. Woodward, S. B., and Feemster, R. F. The Relation of Smallpox Morbidity to Vaccination Laws. *New Eng. J. Med.*, 208, 6:317-318 (Feb. 9), 1933.
11. *Boston School Committee Minutes*, 1792-1814, p. 19.
12. *Ibid.*, 1815-1836, p. 377.
13. *Ibid.*, 1837-1845, p. 134.
14. *Ibid.*, 1837-1845, p. 147.
15. *Ibid.*, 1876, p. 52.
16. *Ibid.*, 1887, p. 67.
17. *Ibid.*, 1870, p. 92.
18. *Ibid.*, 1891, p. 64.
19. Mills, J. H. *Heat, The Warming and Ventilation of Buildings*. American Printing and Engraving Company, Boston. 1890, Vol. II, p. 374.
20. *Ibid.*, p. 375.
21. *Boston School Committee Minutes*, 1867, p. 29.
22. *Ibid.*, 1846-1852, p. 23.
23. *Ibid.*, 1846-1852, p. 97.
24. *Ibid.*, 1862, p. 56.
25. *Ibid.*, 1885, p. 178.
26. *Rules and Regulations*, Boston Public Schools, Section 209, Par. 1, Rev. 1935.
27. *Heat, the Warming and Ventilation of Buildings*, Vol. II, pp. 512-515.
28. Koren, J. *Boston from 1822 to 1922*. City Printing, Boston, p. 95.
29. *Report of Boston School Committee*, 1888, p. 76.
30. *Ibid.*, 1890, pp. 33-36.
31. *Ibid.*, 1886, p. 17.
32. *Ibid.*, 1887, p. 19.
33. *School Document Four of 1895*, Boston, p. 76.
34. *School Document Sixteen of 1907*, Boston, p. 98.
35. *Boston School Committee Minutes*, 1912, p. 29.
36. *Ibid.*, 1915, p. 86.

Sanitary Survey of Beverage Establishments

With Reference to Sanitary Condition of Glassware*

W. L. MALLMANN, PH.D., F.A.P.H.A., AND E. D. DEVEREUX, PH.D.

*Department of Bacteriology and Hygiene, Michigan State College,
East Lansing, Mich.*

SINCE the repeal of prohibition, there have sprung into existence numerous road-houses, taverns, saloons, and miscellaneous establishments for the dispensing of alcoholic beverages. To an alarming extent, these establishments are inadequately equipped to clean and sterilize the glassware used. Furthermore, there is a deplorable lack of information as to methods of cleaning and sterilizing and a surprising array of hurriedly concocted compounds purporting to be disinfectants on the market.

To determine how effectively beverage glasses were being cleaned and sterilized, a survey was conducted in Lansing with the coöperation of the local department of health. Several months prior to this study, the City Council had passed an ordinance requiring the use of chlorine sterilizers and specifically stated that rinse waters must contain 200 p.p.m. of available chlorine. No attempt had been made to see whether these regulations were being obeyed. A preliminary survey showed that few places were even attempting proper care in the handling of glassware, and in most of these the chlorine sterilizers were being grossly misused. Few places in the entire city had satisfactory glass-

ware. Many were not even provided with running water at the dispensing bar. Some were merely dipping the glasses in a pail of water which was changed at infrequent intervals. In a few, wash sinks were located in back-rooms inaccessible to the bar. Appearance of the bar and the wash sinks showed plainly that even rinsing the glasses in water was a rare occurrence.

EXPERIMENTAL

To determine the efficiency of the cleaning and sterilizing processes for glasses in the various establishments, it was thought necessary to examine: (1) the rims of clean and used glasses for the presence of bacteria; (2) the chlorine rinse water, the preliminary water rinse, and the cooling water for bacterial content; and (3) the chlorine rinse water for the presence of available chlorine. To obtain accurate bacterial counts of the chlorine rinse water, all samples were collected in sterile sample bottles to which had been added sodium thiosulphate as recommended by Mallmann and Cary.¹ Prior to sterilization each clean dry bottle received approximately 0.1 gm. of powdered sodium thiosulphate. The bottles were then sterilized in a hot air oven at a temperature not to exceed

* Journal Article No. 218 (M.S.) from the Michigan Agricultural Experiment Station.

200° C. In collecting the samples, care was taken not to rinse the bottles in the solution to be collected, in order to avoid any loss of the sodium thiosulphate. All rinse and cooling waters not containing chlorine were collected in the usual water sample bottle. All samples were rushed to the laboratory and tested immediately after delivery.

Chlorine residuals were determined by the orthotolidine method, using a Wallace & Tiernan Hellige comparator. Readings were made at the end of 10 minutes for the inorganic chlorine compounds, and 30 minutes for the organic chlorine sterilizers.

The bacterial counts of the rims of the glasses was obtained by swabbing. The swabs were placed individually in test tubes containing 0.75 c.c. of sterile saline solution. Both clean and used glasses were tested by swabbing the rims on the inside and outside, to a depth of approximately $\frac{3}{4}$ inch. Swabs were washed off in 3 c.c. of sterile saline solution, and agar plates made using appropriate dilutions. The remainder of the swabs were smeared on blood agar plates. All plates were incubated at 37° C. for 48 hours when total counts were made. The blood agar plates were examined for the presence of streptococci.

To present the bacteriological picture found in the various establishments examined, typical reports of each significant type are reported.

In Report No. 1 is presented a fairly typical picture of a beer garden in which the glasses were rinsed in a tank of water supposedly containing a chlorine disinfectant, but which failed to show any chlorine at the time of examination. The proprietor conscientiously rinsed the glasses in the supposedly chlorine rinse water and then drained them inverted on a rack prior to use. The failure to sterilize the glasses properly was due to the preparation used. The clean glasses showed

an average of 50,000 bacteria per rim while the chlorine rinse water contained 6,000 bacteria per c.c. The number of bacteria on the used glasses was far below that of the clean glasses. This would be expected as the bacteria are washed off into the beverage in the glass. Although the total number of bacteria on the used glasses was low as compared to the number on the clean ones, still 3 of the 5 used glasses examined showed streptococci. This beer garden, although the proprietor

REPORT NO. 1

NO CHLORINE USED IN THE RINSE WATER

	<i>Bacterial Counts per Rim of Glass</i>	
	<i>Clean Glasses</i>	<i>Used Glasses</i>
1.....	83,500	5
2.....	59,000	115
3.....	39,000	50
4.....	69,000	100
5.....	0	0
Average.....	50,100	54

Growth on Blood Agar Plate

	<i>Clean Glasses</i>	<i>Used Glasses</i>
1. Numerous colonies	Numerous colonies	
2. " "	" "	
3. " "	" "	Numerous streptococci
4. " "	" "	" "
5. sterile		" hemolytic streptococci

Bacterial content of rinse water at time of sampling—6,000 per c.c.

believed that he was sterilizing his glasses, typifies the condition wherein the glasses are rinsed in a tank or pail of water which is infrequently changed. Such cases are extremely common, particularly in cities having no ordinances requiring the use of sterilizing agents. In several instances the writers have observed glasses being refilled without cleaning of any nature. In such places it is a question which procedure is worse, washing in dirty water or refilling the glasses without rinsing.

In Report No. 2 is presented a typical case of a popular (heavily patronized) beer garden where a large number of glasses are used. In this establishment, care was exercised by the bartender to maintain a residual chlorine content in

the rinse water. At the time of examination, 18 p.p.m. available chlorine were found. The sterilizer in use was an organic chlorine preparation. The glasses were rinsed for only a few seconds and immediately filled and returned to the patrons. An examination of 5 clean glasses revealed an average bacterial count of 17,000 per rim. The rinse water, although it contained a chlorine residual of 18 p.p.m. contained 36,800 bacteria per c.c. Although the amount of active chlorine should have been sufficient to destroy the bacteria introduced, the activity of the chlorine in this type of compound (organic chlorine) was too slow to destroy them as fast as they were added by the glasses. The result was an accumulation of bacteria that recontaminated the glasses. If the glasses had been inverted and allowed to drain for 5 to 10 minutes the chlorine on the glass

REPORT NO. 2

RINSE WATER CONTAINING 18 P.P.M. (ORGANIC)
CHLORINE WITH FEW SECONDS' IMMERSION
AND GLASSES USED IMMEDIATELY

<i>Bacterial Counts per Rim of Glass</i>		
	<i>Clean Glasses</i>	<i>Used Glasses</i>
1.....	6,200	230
2.....	9,600	610
3.....	39,000	140
4.....	30,000	1,800
5.....	4,100	700
Average.....	17,000	696

Growth on Blood Agar

<i>Clean Glasses</i>	<i>Used Glasses</i>
1. Numerous colonies	Numerous colonies
2. " "	" "
3. " "	" "
4. " "	" streptococci
5. " "	" "

Bacterial content of chlorine rinse water—36,800 per c.c.

would have effected a considerable reduction in bacteria but when they were immediately filled, the beer acted as a dechlorinating agent and protected the bacteria against destruction. A number of places of this type were observed.

In Report No. 3 is presented another type commonly found. At this estab-

REPORT NO. 3

MINIMUM CHLORINE RESIDUAL 7.5 P.P.M. (ORGANIC)
CHLORINE USED IN RINSE WATER

<i>Bacterial Counts per Rim of Glass</i>		
	<i>Clean Glasses</i>	<i>Used Glasses</i>
1.....	520	0
2.....	0	10
3.....	14,500*	0
4.....	0	80
5.....	66,000*	10
Average.....	16,200	20

Growth on Blood Agar Plates

<i>Clean Glasses</i>	<i>Used Glasses</i>
1. 30 colonies	Streptococci (viridans)
2. 35 "	5 colonies
3. 10 "	Streptococci (viridans)
4. Sterile	" "
5. Numerous colonies	Numerous colonies

Bacterial content of chlorine rinse water—0
" " " final rinse water—22,800 per c.c.

* Glasses recontaminated by dirty final rinse water.

lishment the glasses were first rinsed in tap water, then in the chlorine solution, and after varying periods of draining were immersed in a tank of ice water to cool them prior to filling. At the time of inspection the chlorine tank contained only 7.5 p.p.m. available chlorine. The glasses examined had not been immersed in the cooling tank. Five glasses showed an average count of 16,200 bacteria per rim, though 2 of the 5 were sterile. The chlorine rinse water was sterile but no glasses were being rinsed at the time of inspection. The cooling water showed 22,800 bacteria per c.c. Even though the chlorine solution sterilized the glasses effectively, they were reinfected by immersion in the cooling water. The use of cooling tanks should be discouraged unless they have a constant flow of fresh water passing through them.

In a few instances (Reports 4 and 5) fairly satisfactory procedures were in use. Organic sterilizers were used and although the chlorine residuals were low, 4 to 7.5 p.p.m., the exposure was sufficiently long to lower the counts per glass rim to negligible numbers. The glasses were allowed to drain for 5 to 10

minutes after chlorination. Prior to chlorination they were thoroughly rinsed in either tap water in a tank or running tap water to remove any beer, which is necessary if efficient chlorination is to

REPORT NO. 4

MINIMUM CHLORINE RESIDUAL 7.5 P.P.M. (ORGANIC)
CHLORINE WITH GLASSES IMMERSSED FOR FEW
SECONDS BUT ALLOWED TO DRAIN FOR AT
LEAST 10 MINUTES BEFORE USE

Bacterial Count per Rim of Glass
Clean Glasses

1.....	0
2.....	0
3.....	20
4.....	10
5.....	0
Average.....	6

Bacterial content of chlorine rinse water—0 per c.c.

REPORT NO. 5

MINIMUM CHLORINE RESIDUAL 4 P.P.M. (ORGANIC)
CHLORINE WITH GLASSES IMMERSSED AT
LEAST 5 MINUTES

Bacterial Count per Rim of Glass
Clean Glasses

1.....	5
2.....	0
3.....	0
4.....	110
5.....	0
Average.....	23

Bacterial content of chlorine rinse water—0 per c.c.

be expected. Obviously running tap water is the better of the two rinses. In one of the establishments the glasses were rinsed again in tap water prior to filling.

The occurrence of high bacterial counts in rinse water containing chlorine

was coincident with the use of organic chlorine preparations. The delayed action of organic chlorine compounds has been demonstrated by Mallmann and Cary¹ in the case of water disinfection, and in dairy equipment sterilization by Devereux and Mallmann.² In the latter work varying concentration of both types of chlorine sterilizers were passed through dairy equipment. The partially spent chlorine solutions were recovered and found to have a high residual chlorine content though considerably less than the fresh solution used. The writers were interested in knowing the comparative values of these solutions after the available chlorine had been partially destroyed. Five hundred c.c. samples were inoculated with suitable numbers of *Escherichia coli* and transplants were made to nutrient broth at the end of 15, 30, 45, 60, 90, 120, and 180 seconds. The broth was used as a dechlorinating agent, and subsequently all the tubes were plated to determine the number of surviving bacteria for each period of exposure. The data are presented in Table I which is a rearrangement of the data that appeared in Table III of that report. In the case of the inorganic chlorine compound sterilization was effected in 15 seconds with chlorine residuals of 40 and 81 p.p.m. and in 45 seconds with 17 p.p.m. available chlorine. On the other hand, the organic chlorine prepa-

TABLE I

COMPARISON OF ORGANIC AND INORGANIC CHLORINE AS TO SPEED OF DISINFECTION
Test Organism—24 Hr. Culture of *Escherichia Coli*

Sterilizer.....	Inorganic Chlorine			Organic Chlorine		
	81	40	17	76	60	36
Concentration p.p.m.....						
Seconds Exposure	Bacterial Count per c.c.					
15.....	0	0	3,100	55,000	77,300	173,000
30.....	0	0	2,300	29,000	64,700	170,000
45.....	0	0	0	11,500	52,000	112,000
60.....	0	0	0	7,500	39,000	105,000
90.....	0	0	0	6,000	28,000	76,600
120.....	0	0	0	617	34,200	86,000
180.....	0	0	0	0	6,700	51,500
Control	750,000	205,000	141,000	2,324,000	156,300	302,000

ration was comparatively extremely low. It took 180 seconds to sterilize with 76 p.p.m. and no sterilization was effected with either 36 or 60 p.p.m. in the same time. The organic chlorine sterilizer used in these experiments was the same compound encountered in the beer gardens. These data show that the delayed activity of organic sterilizers is the same in partially spent solution as in freshly prepared solutions. The delayed activity does not necessarily condemn these compounds because they have certain properties that are quite desirable, but it means that longer exposures must be used to obtain the same results that can be obtained with the inorganic chlorine sterilizers.

To obtain some idea of the time necessary for beverage glass disinfection with both organic and inorganic chlorine sterilizers, extreme pollution conditions were set up in the laboratory. Typical test organisms representing both Gram-positive and Gram-negative organisms were used. As *Staphylococcus aureus*

has a resistance equal to or greater than most of the Gram-positive pathogenic cocci, this organism was selected. *Escherichia-coli* was selected as a typical representative of the Gram-negative organisms. Suspensions of 24 hour cultures were made using the growth from 3 to 4 well covered agar slants to 100 c.c. sterile salt solution. Clean slides were dipped into these suspensions, immersing one-half of each slide, draining and drying in air.

Seven slides were prepared for each experiment with each organism. Two slides (Nos. 3 and 4) were immersed without agitation in 100 c.c. of a chlorine sterilizer for 20 seconds when they were immediately transferred to a deep culture dish containing 25 c.c. of sterile sodium thiosulphate (approx. 0.5 per cent) water. The slide was agitated for 10 seconds rapidly to free the slide of any viable organisms that remained after chlorination. Subsequently the final rinse water was plated to determine the number of bacteria

TABLE II

THE EFFICIENCY OF AN INORGANIC AND ORGANIC STERILIZER ON THE DESTRUCTION OF ORGANISMS DRIED ON GLASS SLIDES

Sterilizer Concentration p.p.m.	HTH-15 190	HTH-15 175	HTH-15 175	HTH-15 175	Sterichlor 150	Sterichlor 150	Sterichlor 175	Sterichlor 200
Test organism	<i>Esch. coli</i>	<i>Esch. coli</i>	<i>Staph. aureus</i>	<i>Staph. aureus</i>	<i>Esch. coli</i>	<i>Esch. coli</i>	<i>Staph. aureus</i>	<i>Staph. aureus</i>
	plate ct. per slide	plate ct. per slide	plate ct. per slide	plate ct. per slide	plate ct. per slide	plate ct. per slide	plate ct. per slide	plate ct. per slide
Slide No. 1*	22,500	95,000	2,950,000	500,000	200,000	750,000	1,525,000	875,000
No. 2	75,000	125,000	1,550,000	1,500,000	467,000	480,000	1,525,000	875,000
No. 3	0	0	5,000	0	3,050,000	16,750	515,000	92,000
No. 4	250	0	67,500	750	16,000	21,500	780,000	102,000
No. 5	250	0	11,250	0	250	0	315,000	8,000
No. 6	0	0	1,000	0	0	0	290,000	5,500
No. 7	3,000,000	1,700,000	2,700,000	1,400,000	300,000	900,000	2,200,000	3,800,000

* Slide No. 1—Count represents number of viable organisms removed after 20 sec immersion in saline
 Slide No. 2—Count represents number of viable organisms removed after 60 sec. immersion in saline
 Slide No. 3—Count represents number of viable organisms removed after 20 sec. exposure to disinfectant
 Slide No. 4—Count represents number of viable organisms removed after 20 sec. exposure to disinfectant
 Slide No. 5—Count represents number of viable organisms removed after 60 sec. exposure to disinfectant
 Slide No. 6—Count represents number of viable organisms removed after 60 sec. exposure to disinfectant
 Slide No. 7—Count represents number of viable organisms originally dried on the slides

surviving. The sodium thiosulphate in the water neutralized any chlorine that might have been carried over on the slide and prevented further bacterial action. The minimum of 20 seconds was selected because in previous trials it was found that sterility was not obtained with inorganic sterilizers in less time. Slides Nos. 5 and 6 were treated in a similar manner except that exposure in the chlorine solution was for 60 seconds. To check the number of bacteria actually killed by the chlorine, 3 control slides (1, 2 and 7) were tested. Slide No. 1 was immersed in 100 c.c. of sterile water for 20 seconds to simulate the washing that resulted in immersing the slide in the chlorine water bath; then transferred to 25 c.c. sterile water; agitated rapidly for 10 seconds; and agar plates made from this rinse to determine the number of bacteria present. Slide No. 2 was treated in a similar manner except that it was held in the first water bath for 60 seconds. Slide No. 7 was agitated rapidly in 100 c.c. sterile water to remove all of the viable organisms that had been removed in the experiments in the 100 c.c. of chlorine sterilizer and subsequently in the 25 c.c. of water used for the final rinsing of the slide. The chlorine sterilizer was used in concentrations of approximately 200 p.p.m. available chlorine.

Several trials were conducted with both organisms using an inorganic and organic chlorine compound. The results of representative experiments are given in Table II, and show that even with 500,000 to 1,000,000 *Staphylococcus aureus* on an area of 3 sq. in., an inorganic chlorine preparation can effect complete sterilization in 60 seconds. If this large number of *Staphylococcus aureus* can be killed in this time, surely streptococci and other pathogens that are more susceptible to disinfectants and which occur in far smaller numbers on the rims of used glasses can be de-

stroyed. *Escherichia coli* is much more susceptible than *Staphylococcus aureus*, which is to be expected from previous observations on the comparative resistance of these two organisms. Although the organic chlorine compound was able to kill *Escherichia coli* in 60 seconds it failed in the case of *Staphylococcus aureus*. This means that a longer exposure must be used where this compound is used. It would seem on the basis of these data that, in routine sterilization of beverage glasses, a period of exposure of 5 minutes should be required.

DISCUSSION

The fact that many of the establishments dispensing beverages in glasses were not provided with adequate facilities for the effective cleansing and sterilizing of their glassware, and that in many places having adequate equipment and materials, these were not properly applied, demonstrates the need of the development of proper methods of treatment and an educational and regulatory program whereby proper cleansing and sterilization can be assured. It seems needless to point out the dangers of disease transmission by the use of improperly sterilized glasses, since all sanitarians are cognizant of them.

To determine how effective an educational and regulatory program could be made, a plan was formulated. First, on the basis of the experimental work presented the following regulations for the care of beverage glasses were prepared.

1. *Provide rinse to remove material from glass.*—In many places where chlorine rinses were in use, the bartenders were rinsing the beer laden glasses directly in the chlorine water. The organic matter introduced from the beer soon destroyed all available chlorine and the rinse, instead of acting as a sterilizing agent, functioned as an

inoculating bath to give each glass rinsed a composite contamination. In all cases, the glasses should be cleaned before they are immersed in the chlorine water. The amount of cleaning will depend largely on the physical appearance of the used glasses. In places where only beer is dispensed, this cleaning may consist in merely rinsing the glasses in running tap water. The use of still water unless changed frequently should be discouraged.

2. *Provide a tank of chlorine rinse water containing when freshly prepared 200 p.p.m. chlorine and at no time less than 100 p.p.m. This rinse must be changed at least once a day, and oftener if the volume of glassware disinfected reduces the chlorine below the minimum limit.*—The writers have previously observed that any amount of chlorine in excess of the chlorine demand of the water is practically as effective as large excesses, but solutions containing minimum amounts of chlorine have little or no reserve powers. Where a rinse solution is used repeatedly, as under the conditions cited, the reserve chlorine content of the solution when freshly prepared should be as high as the hands can stand without injury. Two hundred p.p.m. is not injurious. A minimum of 100 p.p.m. was established not because concentrations below this figure were considered ineffective, but because it gave the inspector a better opportunity to force the proprietors into a more strict adherence to proper sterilization.

3. *Leave glasses immersed in the chlorine rinse for at least 5 minutes, or immerse and then allow glasses to drain for 5 minutes inverted on a rack without rinsing off the chlorine water.*—This period of exposure gives at least 2 to 3 minutes' safety factor even with organic chlorine preparations and assures sterile glasses. Possibly an exposure of 2 to 3 minutes would be ample, but in the hands of the

average individual the longer period is advisable.

4. *Glasses after draining for at least 5 minutes or being immersed 5 minutes in the chlorine rinse may be placed in running tap water to cool, preparatory to filling with beer or other beverages.*—Preferably glasses should be filled without rinsing off the residual chlorine, but in the case of heavy mugs and glasses it is necessary to cool the glass prior to filling. The use of a tank filled with ice is not recommended, due to the danger of bacteria accumulating and recontaminating the glasses.

5. *All glass disinfectants must receive the endorsement of your department of health before they can be used. Failure to comply will be considered a violation of this code.*—This provision prevents high pressure sales of spurious products such as are flooding the market at present. Since this code was adopted in Lansing a number of such products have been tested and rejected as unsatisfactory.

6. *All glass disinfectants must be of such a nature that the sanitary inspector can by means of a simple test determine the amount of said disinfectant in the rinse water.*—A check on the rinse water is the only convenient test that can be made to insure proper sterilization. There are compounds on the market that will sterilize, but there is no convenient procedure for checking their presence quantitatively, so the inspector must rely on the statement of the proprietors that a disinfectant is being used, and this is highly unsatisfactory. An orthotolidine test for chlorine is easily made and the results furnish dependable evidence, particularly if prosecution is necessary.

At the time this code was put in operation the proprietors of all establishments were requested to attend a meeting for instructions. An attempt was made to impress them with the need of effective sterilization and to

teach them proper methods. It was hoped that an educational program would make them appreciate the fact that the department of health was attempting to assist them, rather than to force the observation of regulations that may have seemed unjustified.

The result of this program has been exceedingly gratifying. After 2 months without any extensive prosecutions, only one establishment was found that was not carrying out the regulations. The proprietor was an uneducated man who had not attended the school of instruction.

SUMMARY

Reports are given showing the common

methods used by taverns for cleaning and sterilizing glassware, few being satisfactory. Excessive numbers of bacteria were found on most of the glassware.

The ability of chlorine sterilizers to kill these organisms was demonstrated. The sterilizers were applied at room temperature in order to duplicate practical conditions, in which the inorganic compounds were more efficient.

Recommendations are given for the proper cleansing and sterilizing of glassware for establishments dispensing beverages.

REFERENCES

1. Mallmann, W. L., and Cary, William. Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine. *A.J.P.H.*, 23, 1:35 (Jan.), 1933.
2. Devereux, E. D., and Mallmann, W. L. Studies of the Technic to Value the Efficiency of Several Chlorine Sterilizers for Dairy Use. *J. Dairy Sci.*, 17:351, 1934.

Scarlet Fever

“ . . . From the above considerations I would suggest that:

1. The term “scarlet fever” be abolished. I have endeavored to show that scarlet fever is an infection by the hemolytic streptococcus not differing from other hemolytic streptococcal infections in any matter of practical importance. But in practice it is found that the retention of the term “scarlet” concentrates attention on what may be the most obvious, but is in reality the less important feature of the disease, namely the rash. I would suggest the term “Hemolytic fevers” be adopted to cover the whole group.

2. It follows that notification should be Hemolytic Fever, not Scarlet Fever. To notify only the cases showing a rash like the textbook description of a scarlet fever rash, is to notify only a part of the epidemic, and on the whole,

experience in Chelmsford suggests that it is the least important part.

3. The use of the isolation hospitals should be restricted to two classes of cases only.

(a) Cases suffering from hemolytic streptococcus infection who are so seriously ill, or in such poor home surroundings, as to make hospital necessary for *treatment*, quite apart from isolation.

(b) Cases suffering from hemolytic streptococcus who, by reason of their home conditions, require to be isolated as being a danger to the community. Such cases as dairymen, people living in hotels, lodging-houses, etc., would come under this category.”—Sleigh, J. C., M.B., Ch.B., D.P.H. (Medical Officer of Health, Chelmsford), Scarlet Fever. *J. Roy. San. Inst.*, June, 1935, p. 662.

Rocky Mountain Spotted Fever in New York State Outside of New York City

E. R. MAILLARD AND E. L. HAZEN

*Division of Laboratories and Research, New York State Department of Health,
Branch Laboratory, New York, N. Y.*

IN view of the scarcity in the literature of reports of Rocky Mountain spotted fever in the eastern section of the United States, it seemed of interest to submit a brief summary of 10 cases presenting clinical evidence of Rocky Mountain spotted fever which have occurred in New York State (outside of New York City) from 1926 to 1934, and to record the results of the agglutination tests performed with *B. proticus* X 19 with blood specimens from the patients.

The 10 patients, 2 of whom were members of the same family, were residents of rural districts in one county on Long Island. The patient referred to in the report of Gilbert and Coleman¹ also lived in the same county. Four of the 10 patients were children whose ages ranged from 2½ to 6 years, and 6 were adults whose ages were from 20 to 52 years. There was an equal distribution of the cases between the sexes. All of the patients became ill either in the late spring or in the summer. Nine of the 10 persons had been in contact with ticks, 5 of whom reported that they had been bitten only a short time before the onset of illness. The remaining patient was a farm laborer whose surroundings and living conditions were fairly good and did not suggest rat infestation. However, he might easily have come in contact with ticks while working in the fields.

The clinical symptoms recorded on the histories accompanying blood specimens received from the patients were such as have been described by Rumreich² for Rocky Mountain spotted fever. The symptoms may be summarized as follows: The onset was sudden. The patients complained of severe headache, marked prostration, loss of appetite, constipation, and fever. The rash appeared early in the disease, first on the extremities, later becoming generalized. This eruption in the initial stages was macular and erythematous in appearance but upon extension became papular and petechial, and in some instances there was a coalescence of the petechiae forming larger hemorrhagic areas which persisted for several weeks. The peak of the temperature in the majority of the cases was 104° F., and in a few it reached 105° F. Nervousness, restlessness, and lethargy were common, and delirium was not unusual. Several of the cases showed rigidity of the neck and back and a few showed paralysis of the extremities. There was slight impairment of sight and hearing in a few instances. The disease was of several weeks' duration and the mortality rate was 30 per cent.

The strain of *B. proticus* X 19 (No. 211) employed in the agglutination test was obtained from Dr. Mooser of Mexico City. An alcohol-treated suspension³ of the microorganisms was em-

TABLE I
Results of Agglutination Tests with *B. Proteus* x 19 and Sera from Patients with Rocky Mountain Spotted Fever

History	Day of illness when blood was collected	Unheated Serum										Serum heated at 56°C. — ½ hr.								Serum heated at 60°C. — ½ hr.					Serum heated at 65°C. — ½ hr.				
		10	20	40	80	160	320	640	1280	2560	10	20	40	80	160	320	640	1280	10	20	40	80	160	10	20	40	80	160	
		4+	4+	4+	4+	4+	3+	2+	—	—	4+	4+	4+	4+	4+	—	—	—	3+	3+	3+	—	—	—	—	—	—	—	—
1. Male 52 yrs. Onset 5/14/26 Recovered	17 24	4+	4+	4+	4+	4+	3+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
2. Male 2½ yrs. Onset 8/11/32 Recovered	18	4+	4+	4+	4+	4+	3+	3+	+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
3. Male 31 yrs. Onset 8/13/32 Died	6	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
4. Female 6 yrs. Onset 8/13/33 Recovered	10 28	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
5. Female 20 yrs. Onset 8/18/33 Recovered	6 12 21	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
6. Female 4½ yrs. Onset 5/26/33 Recovered	14	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
7. Female 43 yrs. Onset 6/5/34 Recovered	10 28	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
8. Male 43 yrs. Onset 8/3/34 Recovered	12 14 15	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
9. Female 33 yrs. Onset 7/25/34 Died	3 7	4+	4+	4+	4+	4+	4+	4+	2+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
10. Male 6 yrs. Onset 7/24/34 Died	5 10	—	4+	4+	—	3+	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

* Inactivated at 58°C.

4+ = Clear supernatant fluid—complete agglutination
 3+ = Clear supernatant fluid—definite agglutination
 2+ = Cloudy or slightly cloudy supernatant fluid—definite agglutination

+ = Cloudy supernatant fluid—agglutination discernible to the unaided eye
 ± = Questionable reaction
 — = Uniformly turbid suspension—no agglutination

ployed, the opacity of which was equal to that of the barium-sulphate standard No. 3.⁴ Such a suspension was employed in every case but one in which a living culture of *B. proteus* X 19 strain No. 211 was used. From one to three blood specimens from each patient were examined, and wherever possible the agglutination test was also carried out with the serum heated for $\frac{1}{2}$ hr. at 56, 60, and 65° C. The tests were read after an incubation period of 2 hours at 45° C., followed by from 16 to 18 hours in the refrigerator. The results of the tests are given in Table I.

SUMMARY AND CONCLUSION

A marked agglutination reaction was demonstrated with *B. proteus* X 19 in the blood sera from 8 of the 10 patients, and partial agglutination was obtained with two of the sera. The latter two specimens were collected very early in the disease as the patients died on the 10th and 11th day, respectively, of their illness. Although no conclusions can be drawn from the few cases studied, the importance of obtaining a series of blood specimens from suspected Rocky Mountain spotted fever cases is indicated. Davis, Parker, and Walker⁵ have recently suggested that three samples of blood should be taken, the first one as soon as spotted fever is suspected, the second during the period from the 10th day to cessation of fever,

and the third at about the end of the first week of convalescence.

The epidemiological and clinical data in this series of cases suggested that the disease was Rocky mountain spotted fever. In 9 of the 10 cases there was either clinical evidence of tick bite or a definite history of contact with ticks before the onset of illness. None of the cases could be associated with flea bites. The distribution and character of the rash in the majority of the cases were strikingly similar, appearing early on the extremities, later becoming generalized. The cases occurred from 1926 to 1934, in the late spring and summer of successive years for the most part, and only in rural localities of the same county; in one instance two members of the same family were infected. There was a mortality rate of 30 per cent in this group of cases.

REFERENCES

1. Gilbert, Ruth, and Coleman, Marion. An atypical Weil-Felix reaction. *J. Infect. Dis.*, 37:559, 1925.
2. Rumreich, A. S. The typhus and Rocky Mountain spotted fever group. Developments in epidemiology and clinical considerations. *J.A.M.A.*, 100:331, 1933.
3. Bien, Dr., and Sontag, F. Herstellung eines haltbaren Fleckfieberdiagnostikums. *München. med. Wchschr.*, 64:1409, 1917.
4. McFarland, Joseph. The nephelometer: an instrument for estimating the number of bacteria suspensions used for calculating the opsonic index and for vaccines. *J.A.M.A.*, 49:1176, 1907.
5. Davis, G. E., Parker, R. R., and Walker, M. E. Further observations on the agglutination of proteus X strains in Rocky Mountain spotted fever. *Pub. Health Rep.*, 49:298, 1934.

Relative Value of Heated Toxin and Toxoid as Controls in the Schick Test

ELLEN LOEFFEL, M.D., AND EDWARD MASSIE, M.D.

*Department of Pediatrics, Washington University School of Medicine,
St. Louis, Mo.*

BECAUSE of the tendency of many adults and certain older children to show nonspecific pseudo reactions with the Schick test, it has been the common practice to use on such persons an additional injection of the test-toxin heated to 75° C. for 5 minutes as a control. This heating destroys the thermo-labile toxin, and any reaction in the control test is considered as a skin sensitivity to substances in the test material other than diphtheria toxin. Persons who react to the control test are read as "negative pseudo" or "combined positive," depending on the comparison of the degree of the reaction produced by the test and the control.

It was soon discovered that "combined positive" reactors, or those who gave positive Schick tests and some reaction also in the control, often tended to show severe local disability and also general toxic reaction when later injections of toxin-antitoxin or toxoid were given. This led Moloney and Fraser¹ to suggest that such susceptibility to the immunizing injections might be more readily determined by using a test of diluted toxoid (1:20) as control, since such a test would serve also as a control for the Schick test.

Since the diluted toxoid obviously contains much more of the nonspecific skin reactive substance than the heated

toxin, it is to be expected that it would reveal more readily those persons sensitive to later immunizing antigen injections. On the other hand, while the pseudo reaction reaches its maximum development in 48 hours and has usually faded by the 4th day when the Schick test is read, a very marked pseudo reaction may persist as long as 4 days. Therefore, the toxoid skin reaction in certain instances might be expected to be so intense as to interfere with the interpretation of the Schick test, that is, it might be difficult to distinguish a negative-pseudo reaction from a combined positive, even as late as the 4th day.

This paper gives the results of a series of tests with Schick toxin, heated toxin control, and toxoid 1:20, in an attempt to determine:

1. Whether the diluted toxoid control contains the nonspecific skin-reactive substance in a concentration so high that the resulting pseudo reaction will confuse the reading of the Schick test.

2. Whether positive tests with both the heated toxin and diluted toxoid indicate that the individual will have a general reaction after injection of toxoid for active immunization.

METHODS

Intradermal injections of Schick test toxin, heated toxin control, and diluted toxoid control were carried out on each

TABLE I

COMPARISON OF REACTIONS WITH HEATED TOXIN AND TOXOID SCHICK TEST
CONTROLS—48 HOURS

	Number of Cases	Heated Toxin Control				Diluted Toxoid Control			
		++	+	±	—	++	+	±	—
Schick Positive	20	1	1	3	15	14	3	3	0
Schick Negative	40	4	3	1	32	26	11	3	0
Totals	60	5	4	4	47	40	14	6	0

of 161 unselected white and colored subjects of both sexes whose ages ranged from 8 to 65 years. The majority of subjects were young to middle-aged white adults. The test group included patients from hospital wards, as well as nurses and medical students. No attempt has been made to differentiate results on the basis of age, sex, or color. The material used was furnished by Ely Lilly and Co., Indianapolis.

Since pseudo reactions reach their height on the 2nd day, all readings were made on the 2nd as well as the 4th and 7th days. Those reactions which measured 20 mm. or more in diameter were called "++"; those between 10 mm. and 20 mm., "+"; while those that showed an area of reaction of more than 5 mm. but less than 10 mm. were called "±." For practical purposes in tabulating results, all ± reactions are considered as negative.

Of the 161 persons tested, 60 had some reaction in one or both controls, and this group formed the basis of the

study. One-third of these were read as "combined positive" and the remainder proved to be "negative pseudo" reactions. The other tests were frank positive (35) or negative (66).

RESULTS

Second day readings—In Table I are summarized the results of the control test readings at the end of 48 hours, and the differences in size and number of reactions produced by the heated toxin and diluted toxoid. It will be seen that with the toxoid control a total of 54, or 90 per cent of the subjects, showed reactions which were more than 10 mm. in size (++ or +) whereas only 9, or 15 per cent, of them showed positive readings with the heated toxin control. Similarly, 40, or two-thirds of the toxoid reactions were larger than 20 mm., while only one-twelfth of the heated toxin tests were of this size.

Fourth day readings—In Table II

TABLE II

COMPARISON OF REACTIONS WITH HEATED TOXIN AND TOXOID SCHICK TEST
CONTROLS—4 DAYS

	Number of Cases	Heated Toxin Control				Diluted Toxoid Control			
		++	+	±	—	++	+	±	—
Schick Positive									
Reading ++	8	0	0	1	7	4	1	1	4
Reading +	12	0	0	1	11	5	1	2	2
Totals	20	0	0	2	18	9	3	2	6
Schick Negative	40	0	4	0	36	9	12	2	17

are shown the results of the same control tests at the end of 4 days—the usual time for reading Schick tests. Here the differences between the reactions of the heated toxin and the toxoid are quite apparent.

It will be seen that whereas a positive reaction is still present with the toxoid control in 33, or 55 per cent, of the 60 cases, there remains a positive reading with the heated toxin in only 4, or 7 per cent, of the subjects. Readings obtained on this day emphasize the importance of the use of a control with the Schick test as well as the advantage of the heated toxin for use as this control. Of the 40 Schick negative readings obtained on the 4th day, 4, or 10 per cent, would have been considered positive if heated toxin had not been used as a control, since the size of the pseudo reaction was sufficiently large to be misleading. Further analysis demonstrates that 12 of the Schick tests which are considered positive with reference to the heated toxin control would be read negative if only

the diluted toxoid control were used. Thus the toxoid control would have caused an erroneous negative reading in 12, or 60 per cent, of the 20 positive Schick tests.

Table III gives the detailed reactions in 4 selected cases and further emphasizes the difference in Schick test readings with reference to the 2 controls since all of these errors of reading the test are apparent.

Seventh day readings—Since Schick tests remain positive for some time and the pseudo reactions fade more quickly, it has been stated that any confusion caused by pseudo reactors would be obviated if the final Schick test readings were delayed until the 7th day.

In Table IV are shown these 7th day readings. It is apparent that the reactions of the diluted toxoid control may be present to a sufficient extent on the 7th day to cause an erroneous reading. This is true in 12, or 60 per cent, of the 20 positive tests. The use of the heated toxin as a control eliminated this error in interpretation of the test.

TABLE III

FOUR EXAMPLES ILLUSTRATING POSSIBLE ERROR IN READING SCHICK TEST USING TOXOID AS CONTROL

	Size of Skin Reaction in mm.			Schick Test Reading Using Only Heated Toxin Control	Schick Test Reading Using Only Diluted Toxoid Control
Day:	2nd	4th	7th		
Case 1					
Schick	12x10	12x10	15x10		
Heated Toxin Control..	6x5	8x5	7x7	Weak Positive	
Diluted Toxoid	20x20	30x20	12x12		Negative Pseudo
Case 2					
Schick	25x20	25x20	25x20		
Heated Toxin Control..	—	—	—	Positive	
Dil. Toxoid Control....	40x32	30x30	25x20		Negative Pseudo
Case 3					
Schick	18x25	20x25	15x15		
Heated Toxin Control..	—	—	—	Positive	
Dil. Toxoid Control....	20x40	20x20	10x15		Negative Pseudo
Case 4					
Schick	15x15	10x10	10x10		
Heated Toxin Control..	8x8	—	—	Positive	
Dil. Toxoid Control....	30x45	25x25	20x20		Negative Pseudo

TABLE IV

COMPARISON OF REACTIONS WITH HEATED TOXIN AND TOXOID SCHICK TEST
CONTROLS—7TH DAY

	Number of Cases	Reactions With Heated Toxin Control				Reactions With Diluted Toxoid Control			
		++	+	±	—	++	+	±	—
Schick Positive									
Reading ++	8	0	0	1	7	4	0	0	4
Reading +	12	0	0	1	11	5	3	2	2
Totals	20	0	0	2	18	9	3	2	6
Schick Negative	40	0	4	0	36	9	12	2	17

Reactions following toxoid injections

—In the group of adults with positive Schick tests, 24 were given an injection of 0.5 c.c. of alum precipitated toxoid subcutaneously. Twenty of these had shown no skin reaction in 48 hours to either the heated toxin or the toxoid control. None of these had any general toxic reaction after the injection although many had a local redness and soreness of varying degree at the point of injection. The other 4 had all shown positive tests in the toxoid control of the 2nd day, and all developed a severe generalized reaction following the toxoid injection. This consisted of intense headache, fever, chills, and malaise lasting 2 to 5 days. Only 1 of the 4 (Case 1, Table III) had had any skin reaction to the heated toxin and this was less than 10 mm. in diameter, but the subject showed the most severe generalized reaction, although only 0.1 c.c. of the alum precipitated toxoid was given. The other 3 of whom Case 3, Table III is one, gave similar control skin tests, positive only with the diluted toxoid. One of them, in addition to the severe general reaction, developed a large sterile abscess at the site of injection. From this small group it would appear that there is insufficient "pseudo-reaction-substance" in the heated Schick toxin control to indicate susceptibility to general reac-

tion from toxoid injections; and also that the injection of alum precipitated toxoid is prone to produce very severe reactions in those persons who give positive skin tests to diluted toxoid.

DISCUSSION

Although the number of subjects studied is comparatively small, the relative value of the two types of Schick test controls seems clearly indicated. Heated toxin, preferably of the same lot used in the Schick test, is a proper control and apparently allows a correct interpretation of pseudo reactions in the Schick test. Diluted toxoid (1:20) on the other hand, is not a true control, and its use in certain instances obscures the reading of the test, since some Schick-positive persons will be interpreted as negative-pseudo reactors. However, the diluted toxoid skin test is superior to the heated toxin control as an indication of the subject's susceptibility or sensitivity to reactions following toxoid injections.

Because pseudo reactions are rare in infants and young children, and since at these ages severe reactions following immunizing injections are almost unknown, it has become customary to omit controls when Schick-testing them. With older children and adults pseudo reactions are much more common, and apparently the skin sensitivity pro-

ducing them is closely associated with the production of severe reactions to immunizing antigen injections.

When toxin-antitoxin was the commonly used antigen, any reactions following injections were usually mild apparently because of the small amount of reacting material present. When toxoid replaced toxin-antitoxin as immunizing antigen, the larger quantity of reacting material produced increasing numbers of severe reactions in susceptible persons. In the more recently used alum precipitated toxoid antigens, apparently the reaction-producing substance is precipitated as well as the toxoid, and their injection may produce severe reactions which are often incapacitating for several days. The indiscriminate use of such injections in older children and adults, therefore, is a matter of some importance, and if the use of a suitable skin test will warn of the danger of such severe reactions, such controls are well worth while. It is not yet certain just what measures are advisable to immunize such susceptible persons, whether toxin-antitoxin injections or small doses of unprecipitated toxoid. It is possible that some method of removing some or most of the offending material may eventually be discovered.

While the value of controls in older children and adults would therefore seem unquestioned, the use of two controls—one of heated toxin as a control for the test, and another for determining sensitivity to toxoid reactions—would be considered impractical by

many. It would seem that both these controls might be combined in one test by using a Schick test solution to which a small amount of toxoid (*e.g.*, 1:20) had been added to increase the amount of pseudo reaction substance present, and to use the same material heated to 75° C. for 5 minutes as a control. With such material, readings at 48 hours would indicate the pseudo reactors who might be expected to develop severe symptoms after toxoid injections and readings on the 4th to 7th day would determine which of these were "negative-pseudo" and which were "combined positive."

CONCLUSIONS

In performing Schick tests, a proper interpretation is possible only when a heated preparation of the same material employed for the test is used as a control. The use of diluted toxoid as a control interferes with the reading of the test by producing more marked pseudo reactions, but is therefore of great value in indicating those persons susceptible to toxic symptoms following immunizing injections of antigen. It is suggested that a more satisfactory Schick test material for older children and adults might consist of a mixture of toxin and toxoid.

REFERENCE

1. Moloney, P. J., and Fraser, C. J. Immunization with Diphtheria Toxoid. *A.J.P.H.*, 17, 2:1027 (Oct.), 1927.

NOTE: This work was done under the supervision of Dr. Jean V. Cooke, to whom we are greatly indebted for advice and criticism.

Survival and Rate of Death of Intestinal Bacteria in Sea Water*

PAUL J. BEARD AND NIEL F. MEADOWCROFT

Laboratories of Sanitary Engineering and Bacteriology and Experimental Pathology, Stanford University, Calif.

THE classic reports of Jordan and his coworkers¹ in 1904 mark the real beginning of systematic studies of typhoid longevity under various natural conditions. Investigations confirming and extending those observations have been in progress more or less continuously from that time to the present date. The majority of the studies have been concerned with the length of the survival of the typhoid organisms in fresh waters of varying degrees of purity. With the development of devastating epidemics of oyster-borne typhoid in 1924-1925, considerable attention has been directed to the longevity of the intestinal group in salt waters and oyster liquors. Bulstrode and Klein² in 1896, Stiles³ 1912, and Round⁴ 1914, were among the early investigators who concerned themselves with the rôle of oysters in the transmission of water-borne disease, while Tonney and White⁵ 1925, Jordan⁶ 1925, Kinyoun⁷ 1925, and Krumwiede and Park⁸ 1926, present the more modern studies.

Of additional importance in directing attention to the viability of the intestinal pathogens in sea water has been the rapid tendency toward the development of beaches for recreational pur-

poses. The problem becomes, then, of acute interest to those municipalities discharging raw or partially treated wastes into oceans, bays and estuaries.

In spite of all the investigations, however, there remains a lack of definite quantitative data concerning the behavior of this group in polluted salt waters. de Giæxa⁹ 1889 seems to have been the first to attack the problem, and others have followed as cited. Approximations of survival time have been indicated, but technical difficulties have interfered with gaining more exact expressions. The possibilities of error in attempting to select a few typhoid colonies from among the many types developed from highly polluted waters even with the most selective media available and the best of technics are obvious.

The report by Wilson and Blair¹⁰ 1927 of a highly selective medium for typhoid isolation offered a possibility of adding to the information at hand upon typhoid survival and rates of death.

After some experimental work the technic of preparing and using the Wilson-Blair bismuth medium was standardized to the point where comparable colony counts of a Rawlings strain of *Eberthella typhosa* were obtained on this medium and routine nutrient agar. From a plate prepared from fresh stools of a typhoid patient 50 colonies selected as typhoid were

* Extract of thesis presented to Committee on Graduate Study in partial fulfillment for the Degree of Engineering.

confirmed on Russell's medium and 20 per cent of these selected at random were confirmed serologically. The data indicate sufficient reliability and selectivity for application of the medium to the study of rates of death.

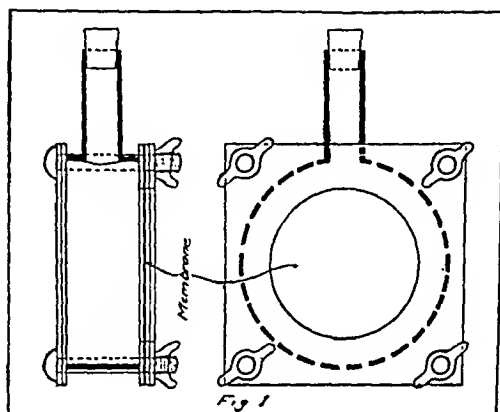
METHODS

It was proposed to follow the procedure of Jordan¹ of immersing fluid cultures of the organism in cells or sacks of membranes permeable to water and at least some of the dissolved and colloidal substances that might be present in the waters under investigation. The construction of the cells is indicated in Figure I. The cells, essentially sideless brass flasks, were made of brass heavily coated with paraffine to prevent any oligodynamic phenomena. A brass plate, paraffine coated, and the permeable membrane covered the back and front of cells, respectively, and were held in position by the clamps indicated in the drawing. Rubber gaskets effectively prevented any leakage in or out of the cells.

The membranes were prepared by soaking filter paper in a solution of 2.5 per cent pyroxylin in glacial acetic acid. Tests showed the *Escherichia coli* was always restrained, but that after prolonged immersion some cultures of *Serratia marcescens* might to a slight extent come through; from which it was indicated that fair sized particles in polluted waters could pass into the cell. The organisms studied were a Rawlings strain of *Eberthella typhosa* and a laboratory strain of *Escherichia coli*.

The field of operation was San Fran-

cisco Bay at Palo Alto, California, into which the untreated sewage, chiefly domestic in type, of that city was discharged. Naturally the constituents of the water are subject to considerable variation. Table I shows the average of a number of analyses at various stages of the tide.



The cells were immersed in duplicate in the waters of the bay. The temperature of the bay waters during these experiments did not deviate greatly from 10° C. In one cell the suspending medium was fresh unfiltered water from the bay, in the other the same water sterilized by passage through an L 3 Chamberland candle.

At appropriate intervals the flasks were taken up, samples were withdrawn, and within 15 minutes were in the laboratory for plating.

A number of such experiments were performed. The general picture obtained was the same in all cases. For economy of space three typical sets of data only are included in Table II.

A number of similar experiments substituting *Escherichia coli* for *typhi* were carried out and one set of those data are presented in Table III.

The data obtained in these studies have been as consistent as could be expected in a situation where environment is not under control.

In all experiments the death rates

TABLE I

AVERAGES OF SEA WATER ANALYSES IN PER CENT

	Stage of Tide		
	Low	Mean	High
Total non-filterable solids	2.29	2.88	2.95
Volatile matter	0.46	0.72	0.58
Fixed solids	1.83	2.16	2.37
Settleable solids c.c./liter	1.00	0.25	1.85

TABLE II

SURVIVAL OF TYPHOID ORGANISMS SUSPENDED IN FILTERED AND UNFILTERED SEA WATER IN CELLS
IMMERSED IN SEA WATER

Days	Viable Organisms per c.c.		Per Cent of Initial Number	
	Filtered Sea Water	Unfiltered Sea Water	Filtered	Unfiltered
0	320,000,000	310,000,000	100.0	100.0
0.3	290,000,000	270,000,000	90.7	84.5
1	89,000,000	16,000,000	27.9	5.0
2	55,000,000	9,000,000	17.2	3.0
3	6,100,000	500,000	1.9	0.16
4	2,010,000	160,000	0.63	0.05
6	720,000	34,000	0.23	0.01
9	44,000	8,900	0.01	+
12	135	2	+	+
14	65	0	+	0
16	0	0	0	0

Experiment 2

0	300,000,000	300,000,000	100.0	100.00
0.3	273,000,000	267,700,000	91.1	89.2
1	84,000,000	23,400,000	28.1	7.8
2	50,000,000	14,100,000	16.7	4.7
3	24,600,000	10,800,000	8.2	3.6
4	10,800,000	9,000,000	3.6	3.0
6	7,200,000	3,000,000	2.4	1.0
9	3,300,000	2,100,000	1.1	0.7
12	270,000	60,000	0.09	0.02
19	10,000	2,000	+	+
28	300	18	+	+
30	25	0	+	0
32	10	0	+	
34	0	0	+	

Experiment 3

0	41,000,000	31,000,000	100.0	100.0
0.3	35,000,000	23,000,000	85.5	74.2
1	9,000,000	11,000,000	23.3	38.5
2	5,800,000	6,850,000	14.2	21.1
3	3,240,000	5,560,000	7.9	17.9
5	9*	305,000	+	0.98
8	0	45,000		0.15
12	0	4,500		+
14		880		+
17		400		+
20		65		+
22		12		+
23		0		0

* See discussion

observed were quite consistent in their respective menstrooms. While the difference was not great, the rate of death was invariably higher in the unfiltered than in the filtered water. By the end of 24 hours this difference was very marked. However, by the end of the third day (72 hours), this difference had begun to be less pronounced. Possibly by this time organisms or substances destructive to the bacteria had undergone death or change.

Experiment 3 is at apparent variance with the other two cited. The data for the first 7 hours, however, were consistent; as a matter of fact those for the first 24 hours were not badly out of line. It is thought probable that leaks in the paraffine coating or filtered water cell may have occurred allowing contact with the metal with resultant oligodynamic death. Earlier test experiments not included here demonstrated this lethal effect. The behavior in the

TABLE III

SURVIVAL OF *ESCHERICHIA COLI* SUSPENDED IN FILTERED AND UNFILTERED SEA WATER IN CELLS
IMMERSED IN SEA WATER

Days	Viable Organisms per c.c.		Per Cent of Initial Number	
	Filtered Sea Water	Unfiltered Sea Water	Filtered	Unfiltered
0	500,000,000	500,000,000	100.0	100.0
0.4	456,000,000	435,000,000	91.2	87.1
0.8	170,000,000	155,000,000	34.1	31.0
2.0	144,500,000	125,000,000	28.9	25.0
4.0	51,500,000	37,000,000	10.3	7.4
6.0	30,500,000	23,000,000	6.1	4.6
13.0	11,000,000	10,500,000	2.2	2.1
20.0	3,750,000	2,650,000	0.75	0.53
27.0	4,200	1,750	+	+
35.0	1,200*	975		

* Membranes showing effects of exposure. Experiment discontinued.

companion cell a few inches away was consistent with other data. The experiment is included here because the survival time of 22 days is of interest.

The initial death rate of *Escherichia coli* in filtered and unfiltered sea water was quite comparable to that of *Eberthella typhosa*. After the first 7 hours, the destruction was much less rapid and the survival period indicated was much longer although this experiment could not be carried to its desired conclusion, by reason of the membrane destruction. The experiment indicates again the reliability of the species as an index of pollution in sea water as in fresh water.

SUMMARY

The experiments demonstrate the reliability and selectivity of the Wilson-Blair, bismuth-sulphite medium for typhoid isolation and quantitative studies in polluted water.

Data are presented showing rates of

death of *Eberthella typhosa* and *Escherichia coli* under closely simulated natural conditions in polluted sea water. The possibility of survival of both species over a period of at least 1 month is indicated.

Escherichia coli is shown to be sufficiently resistant to sea water to serve as an indicator of pollutional conditions in such an environment.

REFERENCES

1. Jordan, E. O., Russell, H. L., and Zeil, H. R. *J. Infect. Dis.*, 1:641-689, 1904.
2. Bulstrode, H. T., and Klein, E. Great. Brit. Local Gov. Bd. *Ann. Report*. 1894-95, 24 (sup.): 1-151.
3. Stiles, G. W., Jr. U. S. Dept. Agri. *Chem. Bull.* 156, 1912.
4. Round, L. A. *Providence, R. I., Rep.*, 1914.
5. Tonney, F. O., and White, J. L. *J.A.M.A.*, 84: 1403-6, 1925.
6. Jordan, E. O. *J.A.M.A.*, 84:1402-3, 1925.
7. Kenyon, C. *Pub. Health Rep.*, 40:819-23, 1925.
8. Krumwiede, C., Park, W. H., et al. *A.J.P.H.*, 16:263-8, 1926.
9. de Giava. *Ztschr. Hyg.*, 6:162-224, 1889.
10. Wilson, W. James, and Blair, E. M. *McV. J. Hyg.*, 26:374-391, 1927.

Control Agglutination Studies Against *B. Dysenteriae* on the Sera of 300 Individuals in New York City

JOSEPH FELSEN, M.D., AND A. G. OSOFSKY

Department of Laboratories and Research, The Bronx Hospital, New York, N. Y.

IN previous reports on outbreaks of Sonne-Duval dysentery¹ and atypical Flexner dysentery² the authors called attention to certain bizarre and unrecognized forms of the disease. Briefly, these were the asymptomatic, constipated, meningitic, and appendicular types. The asymptomatic type is diagnosed only in the course of epidemiological studies. The constipated type formed a well defined group which, paradoxically enough, were typical cases of bacillary dysentery from every other standpoint. The meningitic form occurred in children, was characterized by the usual clinical signs of meningitis, was accompanied by a labial or nasal herpes, but showed entirely negative spinal fluid findings. Subdural inoculations into rabbits in two cases did not reproduce the symptoms or any pathological lesions. The appendicular group was very striking, occurred chiefly in children, closely resembled acute appendicitis, but the operative findings in almost every case revealed a normal appendix, a mystifying mesenteric lymphadenitis and an acute inflammation of the terminal ileum. The detailed clinical and laboratory findings have been described elsewhere.³⁻⁴

The senior author has been privileged to examine more than 300 cases of dysentery in the New York City and

Jersey City areas within the past 16 months, and a serious attempt has been made at careful follow-up and epidemiological studies. Out of this experience certain impressions have been gained.

First, bacillary dysentery is widespread along our coastal and Gulf regions as well as the Great Lakes. We called attention to the rôle played by ocean liners coming into New York, having discovered outbreaks which occurred on 3 of them and possibly a 4th.¹

Second, the disease is frequently unrecognized even during intramural hospital outbreaks. This is particularly true with regard to Sonne-Duval dysentery in children who exhibit very little discomfort and only a slight pyrexia in spite of frequent bloody stools.

Third, inadequate bacteriological and serological studies sometimes account for the failure of diagnosis in hospitals. We have pointed out that repeated cultural, phage and serological studies must be made; that the positive culture bears an inverse relationship to phage and agglutination titer, the first commonly being negative after about the 10th day when phage and agglutination titer become positive. We have suggested careful technical attention to details in agglutination studies, using a variety of agglutinable strains (we

use Shiga, Flexner Y, atypical Flexner-Jersey City, Mt. Desert, Sonne-Duval and Park-Hiss).

Fourth, the senior author believes that he has traced a common pathogenesis for bacillary dysentery and chronic nonspecific ulcerative colitis, the latter being a most insidious disease and apparently on the increase in this country. Twenty-two cases have given laboratory evidence of a previous bacillary dysentery and a review of all the cases seen since 1925 indicates their source as being New York City, Jersey City, New Orleans, Rochester, and Chicago, all of which are endemic areas for bacillary dysentery.

Fifth, bacillary dysentery appears to be definitely increasing in incidence in the United States and should no longer be regarded as a disease indigenous to the tropics. With these facts in mind, we were prompted to study 300 control sera in the New York City area taken from individuals with no clinical evidence of bacillary dysentery.

Technical procedure—Table I illustrates a typical set-up in which 3 dilutions of each serum were tested against the following strains of *B.*

dysenteriae, viz.: Flexner Y, atypical Jersey City, Mt. Desert, Sonne-Duval, and Shiga. The serum was so diluted that upon the addition of an equal quantity (0.5 c.c.) of broth culture, the resulting dilutions were 1:20, 1:40 and 1:100. The organisms were added in the form of an 18 hour, sugar-free broth culture (pH 7.0). In the actual tests it was found advantageous to test 10 sera at one time. This allowed for greater simplicity of technic and increased uniformity in the reading of the results. Incubation was carried out for 4 hours at 55° C., but final readings were taken only after the tubes had remained in the ice box over night. The readings at the time were always more distinct than those obtained immediately after incubation. A positive result was recorded in every case where definite agglutination was visible even though it was not complete. A reading of ++ or greater was considered positive. Previous to their use in the actual tests all cultures were tested for purity, for their action on carbohydrates, and for their agglutinability with known immune sera. It was also determined that the organisms were all of the S

TABLE I
PROTOCOL SHOWING SET-UP OF SERUM TO DETERMINE THE PRESENCE OF NORMAL AGGLUTININS

Tube	Serum	Culture	Agglutination
	4158		
1	0.5 c.c. 1:10	0.5 c.c. <i>B. dys.</i> Flex. Y	++++
2	" 1:20	" "	+++
3	" 1:50	" "	0
4	" 1:10	" <i>B. dys.</i> Flex. (JC)	++++
5	" 1:20	" "	++++
6	" 1:50	" "	+++
7	" 1:10	" <i>B. dys.</i> Mt. Desert	0
8	" 1:20	" "	0
9	" 1:50	" "	0
10	" 1:10	" <i>B. dys.</i> Shiga	++++
11	" 1:20	" "	++++
12	" 1:50	" "	0
13	" 1:10	" <i>B. dys.</i> Sonne-Duval	0
14	" 1:20	" "	0
15	" 1:50	" "	0
16	" Saline	" "	0
17	" "	" <i>B. dys.</i> Shiga	0
18	" "	" <i>B. dys.</i> Mt. Desert	0
19	" "	" <i>B. dys.</i> Flex. (JC)	0
20	" "	" <i>B. dys.</i> Flex. Y	0
21	" 4158-1:10	" Saline	0

Incubated 4 hours at 55° C.

TABLE II

CONTROL AGGLUTINATION STUDIES AGAINST *B. DYSENTERIAE* ON 300 SERA

Dilution		Organism				
		<i>B. dys.</i> <i>Flex. Y</i>	<i>B. dys.</i> <i>Flex. (JC)</i>	<i>B. dys.</i> <i>Mt. Desert</i>	<i>B. dys.</i> <i>Shiga</i>	<i>B. dys. Sonne-</i> <i>Duval</i>
1:20	Number of sera tested	300	300	300	300	300
	Number of sera agglutinating	78	59	48	56	6
	Percentage of sera agglutinating	26%	19.7%	15%	18.7%	2%
1:40	Number of sera tested	300	300	300	300	300
	Number of sera agglutinating	46	36	40	40	3
	Percentage of sera agglutinating	15.3%	12%	13.3%	13.3%	1%
1:100	Number of sera tested	300	300	300	300	300
	Number of sera agglutinating	13	17	25	13	1
	Percentage of sera agglutinating	4.3%	5.7%	8.3%	4.3%	0.3%

type. Saline, 0.85 per cent, was used as a diluent.

The results of this study are shown in Table II. It will be noted that diagnostic titers of 1:100 were obtained in 4.3 per cent against the Flexner Y and Shiga strains, in 5.7 per cent against the Jersey City strain, in 8.3 per cent against the Mt. Desert strain which is common in New York City, but in only 1 case (0.3 per cent) against *B. dysenteriae* Sonne-Duval. Inquiry revealed that the patient was suffering from an acute attack of bacillary dysentery, this case being included in our series because the diagnosis had been completely overlooked.

Two possibilities are suggested by these figures, viz.: first, the relatively high incidence of diagnostic agglutination titers and, therefore, presumptive evidence of a previous dysentery infection (4.58 per cent average for all strains); second, the notable absence of high titers against *B. dysenteriae* Sonne-Duval. The first observation is confirmatory, to a limited degree, of Ritchie's work⁵ in which 792 sera gave a titer of 1:32 against the Shiga strain in 30 per cent and a titer of 1:64 against the Flexner strain in 41 per cent. The absence of high agglutination titers against the Sonne-Duval strain may be due to the comparatively recent

introduction of this form of dysentery into New York City or to the fact, as we have noted repeatedly in our cases to date, that in most instances agglutinins produced by this organism rapidly disappear after a few weeks. We have not seen a persisting titer of 1:100 in the follow-up studies of a single recovered case in our series. Sonne^{6,7} called attention to the low titers obtained in most of his cases. Smith and Fraser,⁸ moreover, regard a titer of 1:50 as diagnostic of a previous Sonne-Duval infection, a level distinctly lower than that commonly accepted for the other dysentery strains. These investigators, working in Aberdeen, where the Sonne-Duval type of dysentery is of relatively frequent occurrence, obtained a titer of 1:50 in 24 per cent of 138 normal persons. They therefore concluded that the disease was widespread in the region studied. These figures are significant therefore when compared with our control studies in the New York area. We have furnished figures, moreover, to indicate the increasing incidence of Sonne-Duval dysentery in New York City where most of the recognized cases occur in hospital outbreaks.

Working along similar lines with the dysentery skin reaction, Brokman and Popowski⁹ found positive skin reactions against Shiga-Kruse toxin in 51

per cent of children up to the age of 3 years, in 27 per cent between the ages of 4 and 15 years, and in 59 per cent of adults between the ages of 16 and 23. They used 1/100 rabbit m.l.d. Using 0.1 c.c. of a 3 per cent dilution of the toxin intradermally Brokman and Przesmycki obtained positive reactions in 80 per cent of 1,000 individuals examined.¹⁰ Neutralization tests and control studies indicated that these reactions were caused not by the injection of a foreign proteid, but by the absence of humoral antitoxins from the blood. Our series is as yet too small to permit any accurate deductions, but it appears that the positive skin reactions like agglutination titers vary considerably depending upon the prevalence of bacillary dysentery in the region studied.

In connection with agglutination studies in Sonne-Duval dysentery we wish to call attention to two possible sources of error. We consider this important because we must not add inaccuracy of technical procedure to

the difficulties of clinical diagnosis (for it is remarkable how comfortable some children with the bloody diarrhea of Sonne-Duval dysentery really are). Braun and Weil¹¹ have pointed out the lack of cross-agglutination between R and S forms. More recently Koser¹² and coworkers and Johnston and Kaake¹³ have stressed this characteristic in explaining apparent paradoxical findings. Wiseman¹⁴ and Fyfe¹⁵ called attention to the inagglutinability of some freshly isolated Sonne-Duval strains.

It may be of interest to note the incidence of multiple agglutination titers of 1:100 in our control series. These were Mt. Desert and Shiga 1.3 per cent; Jersey City Flexner strain, Mt. Desert and Shiga 0.3 per cent; Flexner Y, Jersey City and Mt. Desert 0.3 per cent; Flexner Y, Jersey City, Mt. Desert and Shiga 0.3 per cent; Flexner Y, Jersey City and Shiga 0.3 per cent.

The duration of agglutination titers following an acute dysentery infection

Percentage
of agglu-
tinating
sera

AGGLUTINATION OF 300 NORMAL SERA WITH DYSENTERY BACILLI

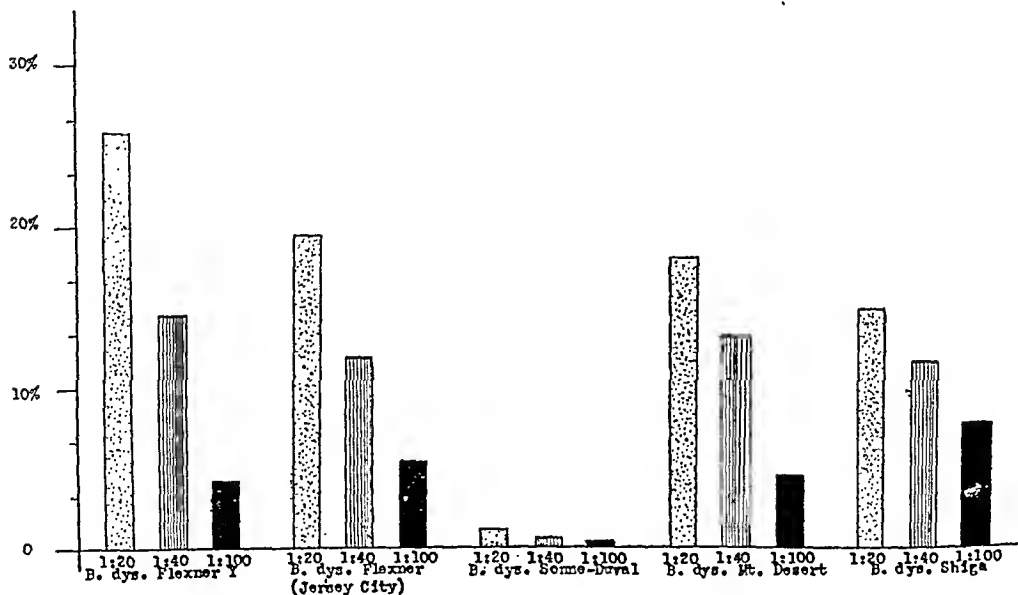


TABLE III

AGGLUTINATION TITERS IN 20 CASES OF NON-SPECIFIC ULCERATIVE COLITIS

No.	Patient	Duration of Disease (years)	Titer
1	A.S.	8	Mt. Desert 1:320; Flexner Y 1:160
2	M.P.	5	Flexner Y 1:320; Mt. Desert 1:160
3	P.S.	10	Mt. Desert 1:320
4	R.H.	$\frac{3}{4}$	Mt. Desert 1:160
5	L.W.	2	Flexner Y 1:160
6	H.P.	6	Flexner (Jersey City) 1:320
7	M.B.	4	Mt. Desert 1:160
8	S.T. (child)	2	Mt. Desert 1:80
9	L.G.	4	Sonne-Duval 1:40
10	S.P.	1	Flexner Y 1:160
11	T.G.	2	Mt. Desert 1:160
12	J.D.	$1\frac{3}{4}$	Park-Hiss 1:80
13	G.E.	1	Mt. Desert 1:640
14	S.G.	7	Mt. Desert 1:160; Flexner Y 1:160
15	M.B.	$\frac{3}{4}$	Mt. Desert 1:160
16	E.G.	5	Park-Hiss 1:240; Mt. Desert 1:160
17	M.B.	3	Mt. Desert 1:160
18	B.G.	2	Park-Hiss 1:320; Flexner Y 1:160
19	M.W.	$\frac{3}{4}$	Mt. Desert 1:320
20	S.K.	$\frac{3}{4}$	Flexner Y 1:160

is not definitely known. Our cured acute cases of Flexner Y and Mt. Desert dysentery followed up to date showed for the most part a persistent high titer at the end of one year. Our Sonne-Duval cases are an exception, as stated above. The follow-up on the cases of nonspecific ulcerative colitis studied by one of us¹⁶ is very interesting. The familial incidence is high, the first 3 patients in Table III being a brother and two sisters. The evidence at hand points very strongly to the origin of this disease as a primary bacillary dysentery infection. The de-

tails of these cases have been reported.

The data herein presented indicate the prevalence of bacillary dysentery in one area on our eastern seaboard. Supplementary serological findings suggest the close etiological relationship between bacillary dysentery and non-specific ulcerative colitis.

REFERENCES

1. Felsen, J., and Osofsky, A. G. Sonne Dysentery. *J.A.M.A.*, 103:966 (Sept. 29), 1934.
2. Felsen, J., Rundlett, E. V., Sullivan, J., and Gorenberg, H. Atypical Flexner Dysentery. A Preliminary Report of the Jersey City Epidemic. *J.A.M.A.*, 103:1055 (Oct. 6), 1934.
3. Felsen, J. Clinical Notes Concerning Distal Ileitis as a Manifestation of Bacillary Dysentery. *Am. J. Digest. Dis. and Nutrition*, 1:782 (Jan.), 1935.
4. Felsen, J. The Appendicular Form of Bacillary Dysentery (With Case Reports on Acute Distal Ileitis). Accepted for publication *Am. J. Dis. Child.*
5. Quoted from Stitt, E. R. Practical Bacteriology.
6. Sonne, C. *Gifsfattige Dysenteribacillen*. Copenhagen, 1914.
7. Sonne, C. *Centralbl. f. Bakt.*, I, Orig., 75:408; 76:65, 1915.
8. Smith, J., and Fraser, A. M. Agglutination Reactions in Relation to Sonne Dysentery. *J. Hyg.*, 30:216 (June), 1930.
9. Brokman, H., and Popowski, S. The Relative Frequency of the Positive Dysentery Skin Reaction at Different Ages. *J. Immunol.*, 12:45, 1926.
10. Brokman, H., and Przesmycki, F. Experiments on the Sensitivity of the Human Skin to the Toxin of the Bacillus of Shiga-Kruse. *J. Immunol.*, 11:361, 1926.
11. Braun, H., and Weil, A. J. *Centralbl. f. Bakt.*, I, Orig., 109:16, 1928.
12. Koser, S. A., Reiter, D. O., Bortniker, E., and Swingle, E. L. A Study of Bacterium Dysenteriae, Sonne Type. *J. Prev. Med.*, 4, 6:477 (Nov.), 1930.
13. Johnston, M. M., and Kaake, M. J. Studies on *B. Dysenteriae* Sonne. *Canad. Pub. Health J.*, 1931.
14. Wiseman, W. R. *Lancet*, 1:817; *J. Hyg.*, 26:187, 1927.
15. Fyfe, G. M. *J. Hyg.*, 26:271, 1927.
16. Felsen, J. Non-specific Ulcerative Colitis, Terminal (Distal) Ileitis, and Bacillary Dysentery. Their Common Pathogenesis. *New York State J. Med.* 35:576 (June 1), 1935.

A Modified Technic for the Detection of the *Escherichia-Aerobacter* Group in Milk

ANDREW MOLDAVAN

Bacteriologist, Guaranteed Pure Milk Co., Ltd., Montreal, Quebec

IN the 1934 edition of the A.P.H.A. *Standard Methods of Milk Analysis*, a provisional method for the detection of *Escherichia Aerobacter* organisms in milk is described with a forewarning that "discretion must be observed in the application of this determination to the specific purpose intended and particularly in the interpretation of the results obtained."¹

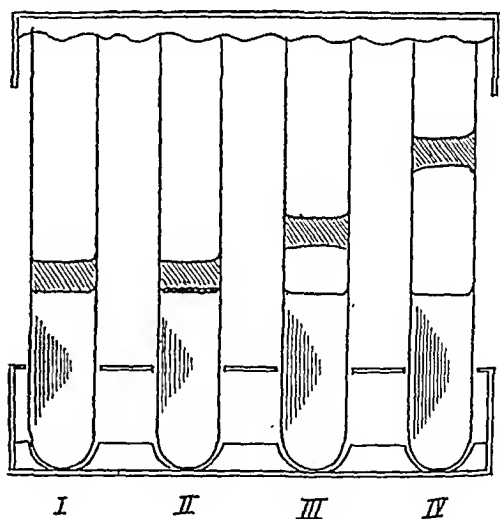
Lochhead and Johns have also pointed out that "in milk analysis the coli count has not the same public health significance it has in water analysis."²

It is generally agreed that in most cases, positive results from samples of pasteurized milk are due to non-fecal, "dairy-bred" organisms, the presence of which indicates faulty sterilization or improper pasteurization rather than fecal contamination of human origin.

For nearly two decades the *Escherichia aerobacter* fermentation test (2 per cent bile brilliant green lactose peptone) has been carried as a complementary test to the standard plate count by the Quebec Provincial Laboratories, the Montreal Health Department, and by industrial laboratories. That it is possible under practical conditions to produce pasteurized milk consistently free from gas-forming *Escherichia aerobacter* organisms has been conclusively demonstrated by these authorities.³

The inverted tube (Durham) or the

Smith fermentation tube technics may be used although Section H-VI of the A.P.H.A. provisional milk standards recommends the use of inverted vials. Unfortunately, the description of the technic of inoculation and distribution of the inoculum in the medium is not so elaborate as that of the standard plate method, and allows for considerable variation from one laboratory to another. While the ratio of inoculum to medium is well defined, the size and diameter of the tubes and the mixing technic are not described.



AGAR SEALED FERMENTATION TUBES

I—Negative—48 hours.

II—Positive — 8 hours (Bubbles).

III—Positive —16 hours.

IV—Positive —36 to 48 hours.

One way of determining the ratio of milk inoculum introduced into the inverted gas tube is to test its content for butter fat. The butter fat tests (in skim-milk Babcock bottles) show that the amount of milk introduced into the inverted gas tubes varies from 0.1 to 0.5 c.c. for 1 c.c. inocula, depending upon the diameter of the tubes and the degree of agitation-rotation. In the close-arm of Smith fermentation tubes the ratio is about 0.5 c.c. Positive results should not therefore be referred to as positive for 1 c.c. but as positive for less than 0.5 c.c. of milk.

To secure a greater accuracy several British and American workers are using ordinary test tubes, sealing the inoculated medium with sterile paraffin. The chief disadvantage of paraffin is that it renders cleaning of tubes very cumbersome, especially where a large number of tests is made.

Since 1931 this laboratory has used agar in preference to paraffin. The technic was demonstrated at the time to members of the A.P.H.A. Laboratory Section attending the Montreal meeting.

The tubes are filled with 9 c.c. of 2 per cent bile brilliant green lactose peptone medium (Difco) and sterilized. The plug material consists of sterile 2 per cent agar (Difco). As soon as the medium has been inoculated with 1 c.c. of milk, the tube is rolled between hands to insure a uniform distribution, 2 c.c. of the melted 2 per cent agar (45° to 55° C. according to room temperature) is poured slowly along the tube's side where it cools rapidly (37° C.), and forms a solid cylindrical plug over the medium. A certain

amount of dye diffuses through the agar plug and inhibits extraneous growths. Rising milk fat in the tube acts as "piston-grease" making the agar plug practically air-tight.⁴

The advantages of this technic are the following:

Results can be reported definitely as positive or negative for 1 c.c. of milk independently of the tube's diameter or the degree of agitation.

The A.P.H.A. provisional method calls for a 48 hours' incubation period so that under practical conditions 3 days have elapsed before any action can be taken to correct the source of contamination, long after the milk is consumed.

In agar-plugged tubes, traces of gas (bubbles or foamy layer) will appear earlier or at any rate are more noticeable than in submerged inverted tubes. In positive samples, gas will be detected within 16 hours and in cases of gross contamination within 8 hours, so that early action can be taken as regards equipment sterilization. In exceptionally serious cases, the contaminated milk supply may be condemned before it is actually distributed.

Another minor advantage is the greater ease with which tubes can be thoroughly cleaned as compared with the cleaning of greasy and stained small inverted tubes or Smith tubes.

REFERENCES

1. A.P.H.A. *Standard Methods of Milk Analysis*, 6th ed., 1934.
2. Lochhead, A. Grant, and Johns, C. K. Sterilization of Dairy Utensils. *Canad. Pub. Health J.*, Feb., 1935.
3. McCrady, M. H., and Langevin, Em. The Coli-Aerogenes Determination in Pasteurization Control. *J. Dairy Sci.*, 1932.
4. Moldavan, A. *Food Bacteriology*, 1934, p. 49.

Simultaneous Immunization Against Smallpox and Diphtheria*

CHARLES S. STERN, M.D.

Commissioner of Health, West Allis, Wis.

THE practical advantages of immunizing a child against two diseases at one sitting are obvious. In private practice as well as in the mass immunizations by public health agencies, it is often difficult to have children return for successive injections. Diphtheria immunization by the one dose alum toxoid method has done much to simplify this difficulty. The simultaneous use of the one dose method of diphtheria immunization with vaccination against smallpox is herewith presented.

Multiple immunizations of this character have been found as effective as separate immunizations, and unaccompanied by any greater reactions than are produced by single injections of the respective materials.

The power of the animal body to produce specific precipitins following the injection of several antigens has been established by Hektoen and Boor; Isabolinski, Judenitch, and Karpatschewskaja; and others. In human subjects, scarlet fever vaccine and diphtheria anatoxin has been given simultaneously by Isabolinski and his coworkers; diphtheria and scarlatinal toxoid by Tsen; diphtheria anatoxin and antityphoid vaccine by Dopter; diphtheria toxin-antitoxin, typhoid vaccine, and smallpox virus by McKean;

diphtheria toxoid and smallpox virus by Reckling.

Since June, 1934, we have used the simultaneous multiple method of immunization against smallpox and diphtheria in all children presented for immunization against these diseases. These children had not been previously immunized against smallpox or diphtheria.

We have tabulated the results of 100 consecutive cases of school and pre-school children who were simultaneously inoculated with smallpox vaccine and alum precipitated toxoid, in Table I.

The deltoid area of each arm was thoroughly cleaned. The left arm was dried, a drop of vaccine was placed on the deltoid region. The "multiple pressure" method for vaccination was used. The skin on the right deltoid was painted with tincture of merthiolate solution, and 1 c.c. of alum precipitated toxoid was injected subcutaneously.

During the first 72 hours following the inoculations the staff nurses visited the home to ascertain whether or not there was any immediate local or constitutional reaction. There were no immediate ill effects in any of the children. There was a slight rise in temperature in two of the children noted the evening of the day of the inoculation. One child had a mild local reaction at the site of the alum precipitated toxoid inoculation. In one

* Preliminary Report.

TABLE I
STUDY OF RESULTS OF SIMULTANEOUS MULTIPLE IMMUNIZATIONS *

Age	No. Receiving Treatment	Schick		Vaccination		
		Negative	Positive	"Take"	No "Take"	Reaction
Under 1 year	8	8	0	8	0	0
1- 2 years.....	11	10	1	10	1	0
2- 3 years.....	16	15	1	15	1	1 a
3- 4 years.....	24	24	0	24	0	1 a
4- 5 years.....	16	15	1	16	0	0
5- 6 years.....	16	15	1	16	0	2 b-c
6- 7 years.....	3	3	0	3	0	0
7- 8 years.....	0	0	0	0	0	0
8- 9 years.....	2	1	1	2	0	0
9-10 years.....	3	3	0	3	0	0
10 years and over..	1	1	0	1	0	0
	100	95	5	98	2	4

a. Slight rise in temperature evening of inoculation.

b. Pain at site of alum precipitated toxoid inoculation.

c. Vomiting on second day following inoculation.

* Material Used: Alum precipitated toxoid 15 antigenic units per c.c.; glycerinated smallpox virus vaccine.

instance the child had a vomiting spell on the second day following the administration of the simultaneous inoculations. The reactions were mild and without ill effects.

The simultaneous multiple immunization against smallpox and diphtheria did not affect the immunity or rapidity of immunity produced against diphtheria as indicated by the Schick test readings. Of those preschool and school children whose immunological status to diphtheria was unknown, 95 per cent became Schick negative after receiving the alum precipitated toxoid in our routine simultaneous multiple immunization. These results compare favorably with children who received but a single inoculation of alum precipitated toxoid. It is interesting to note that 98 per cent of the children in this group had a positive vaccination reaction.

We have compared our results of simultaneous multiple immunization with the results we have obtained from the single immunization method formerly used in diphtheria and smallpox prevention. From our files, 100 cases

of preschool and school children whose immunological status to diphtheria was unknown, and who had received alum precipitated toxoid were analyzed. The reactions and the result of the Schick readings were tabulated—94 per cent of these children became Schick negative. The reactions noted were mild.

The result of vaccination against smallpox was noted in children who had previously been inoculated against diphtheria. The percentage of positive smallpox "takes" was somewhat less than in those children who received simultaneous immunization against diphtheria and smallpox.

CONCLUSION

1. The simultaneous multiple immunization against smallpox and diphtheria is a practical method applicable as a routine procedure in mass immunization as well as in private practice.

2. The simultaneous immunization against diphtheria and smallpox is a safe procedure.

3. The simultaneous immunization against diphtheria and smallpox is effective.

EDITORIAL SECTION

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GASTRIC LAVAGE FOR THE DETECTION OF TUBERCLE BACILLI IN CHILDREN

DURING the past two years a number of articles have appeared on the finding of tubercle bacilli in the gastric contents of children. Children do not raise sputum and expel it as adults do, but swallow what gets into the mouth from the air passages. It is generally assumed that tubercle bacilli found in the stomach contents have their origin in the lung. It is evident that other sources may exist, such as raw milk or a tuberculous lesion somewhere in the upper air passages or tonsils. It is possible also, though improbable, that a tuberculous lesion of the stomach may exist.

Gourley¹ examined 59 children with pulmonary tuberculosis over a period of 2½ years by gastric lavage and guinea pig inoculation, her object being to determine whether or not it was possible for children with parenchymal lesions to be free from tubercle bacilli, and also to determine when an open case becomes a closed one. Autopsies were performed on the guinea pigs from 4 to 8 weeks after inoculation and no case was considered positive unless tubercle bacilli were demonstrated. Thirty-one children gave negative results, and of these, 29 per cent were under 6 years, while of the positive group, 50 per cent were under this age. The intracutaneous tuberculin test was positive in all the negative cases. Of the 28 children who gave positive results by gastric lavage all had run favorable clinical courses. The author believes that the results, which are given in detail in the original article, indicate all types of parenchymal lesions in childhood tuberculosis are open cases, but positive conclusions are held in abeyance pending further work.

Mishulow, Kereszturi, and Hauptman² examined the feces and stomach contents of 60 cases with the object of studying the comparative value of methods of diagnosis. In 12 cases the feces, and in 16 the gastric contents, were positive on smear examination, 11 of the group being positive for both

feces and gastric contents. Of 44 whose gastric contents were negative on smear examination, 4 gave positive results by inoculation of guinea pigs, bringing the total number of positives by the gastric lavage method to 20, or $33\frac{1}{3}$ per cent. The examination of feces is more practicable than gastric lavage, since it may be repeated frequently with ease.

Nalbant³ has reported on 72 cultures and guinea pig inoculations from the feces and sputa of 65 children under 15 years of age, 24 of which showed tubercle bacilli. Nineteen showed no demonstrable parenchymal lesion by either physical or radiological examination and were considered negative as far as the lungs were concerned. Among these, tubercle bacilli were found in the sputum or feces of 7. The other 17 positives were from children with a childhood type of tuberculosis.

This author summarizes the literature on the examination of gastric contents of children and notes that of a total of 197 children without pulmonary tuberculosis, but including bone and joint cases and tuberculous meningitis, 81, or 41 per cent, showed tubercle bacilli in either the gastric contents or the feces, indicating active disease.

Hacker and Wallis⁴ examined the gastric fluid of 50 children by animal inoculation, waiting an average of 40 days to make the examination of the inoculated animals. They found that 15 of the 50 children had open tuberculosis, and that younger children were positive for bacilli more often than the older ones. This they believe to be due to the fact that in younger children primary lesions are more frequent, which results in a greater tendency to form open tuberculosis.

While these studies were apparently undertaken for other reasons, such as have been mentioned, they suggest the interesting possibility that such cases may be responsible for obscure cases of infection often found in children. Nalbant believes that the organisms may come from a receding childhood type of parenchymal infiltration which cannot be detected by the X-ray but which is not yet completely free of bacilli. Another supposition is that the bacilli may come from the breaking down of a lymph node and the pouring of its contents into the bronchus from which it goes to the mouth and is then swallowed. He considers that children with tubercle bacilli in the stools and stomach are a menace to uninfected children and should be isolated in a sanatorium and treated as tuberculous. Such children should be repeatedly examined and not allowed to mix with others until bacilli free.

These interesting studies may serve to clear up some of the difficulties in tracing the origin of obscure cases, and it is evident that this method of examination should be carried out to determine when children become clinically well of their tuberculosis and free from tubercle bacilli. The wide adoption of such methods should be at least one step in the prevention of the disease.

REFERENCES

1. Gourley, Ina. Tubercle Bacilli in the Gastric Contents of Tuberculous Children. A Study of 59 Cases. *Am. Rev. Tuberc.*, 5:461-470, 1934.
2. Mishulow, Lucy; Kereszturi, Camille; and Hauptman, D. The Demonstration of Tubercle Bacilli in the Sputum, Faeces and Stomach Contents of Tuberculous Children. A Comparative Study. *Am. Rev. Tuberc.*, 5:471-480, 1934.
3. Nalbant, J. P. Tubercle Bacilli in the Sputum and Faeces of Children Without Pulmonary Tuberculosis. *Am. Rev. Tuberc.*, 5:481-484, 1934.
4. Hacker, E., and Wallis, K. Demonstration of Tubercle Bacilli in Gastric Irrigation Fluid of Children. *Wien. Arch. f. inn. Med.*, Vienna, 26:379 (Apr.), 1935. Abstracted in *J.A.M.A.*, 104:2221, (June 15), 1935.

HUMAN INFECTION BY THE AVIAN
TUBERCLE BACILLUS

THE question of human infection by the avian tubercle bacillus has come up many times and a considerable amount of material has been written concerning it. A few reports of such infection seem to be authentic. The majority of them appear to be open to question. The many ways in which man is exposed to the avian tubercle bacillus and the very few cases, even doubtful ones, which have been reported, indicate that if the avian bacillus can infect man the actual occurrence is rare.

The avian type of the bacillus has been found in eggs by a number of responsible workers. Klimmer, 1931, held that as high as 3 per cent of market eggs and 10 per cent of eggs from tuberculous fowls contained avian bacillus, but an investigation by Lichtenstein in 1932 showed that only 0.38 per cent of eggs in stores and dairies in Leipzig gave positive results. Against these reports are many in which eggs were found to be free from this infection.

Cattle are occasionally found to be infected by the avian bacillus, and during the last few years Van Es has published a number of articles showing that this type of organism is responsible for a rather high degree of infection. In specimens from 115 cattle having only isolated lesions, such as solitary lymph nodes, the avian organism was found in a little more than 12 per cent. In 258 swine with discrete lesions, the avian organism was found in 199, or 78.6 per cent. The percentage of so-called natural infection of animals varies in different countries. In England approximately 30 per cent of the localized tuberculosis in swine is due to the avian organism. Avian tuberculosis has been found in a number of animals, such as the horse, sheep, and rabbit, but is rare. It is especially liable to be found in both cattle and hogs in those cases which show discrete lesions.

The avian organism is found occasionally in milk. In one report covering 400 samples, the avian bacillus was found 9 times by culture. In this country meats are almost invariably cooked before being eaten. Eggs offer a slight possibility of infection, and also milk, but at worst the opportunities do not seem to be excessive.

Branch,¹ in 1931, made a study of the literature for what he considers authenticated cases. He has found 14, 5 of which were renal tuberculosis, 1 of pulmonary involvement; 1 splenic involvement; 1 lesions of mesenteric lymph nodes; 1 cutaneous abscesses; ulcers of nose, mouth and intestine; 1 ulcers of palate and of skin of nose; 1 septic fever; ulcers of tongue, lips and scrotum, swelling of knee joint; 1 ulcer of leg; 1 abscess of leg; and 1 septic fever, Pel-Ebstein's syndrome. Three of the cases occurred in poultry workers or farm hands, 4 giving a positive avian tuberculin test. In 9, the type of organism was confirmed by animal inoculation, including fowls. In only one case is an autopsy recorded. Branch gives many references, but apparently he does not consider any other cases authentic or as having been proved.

In 1926,² there were reported by Mayo and Hendricks 2 cases which they claimed were "demonstrated surgically and pathologically" to be avian tuberculosis. The report of the pathologist was given, but no cultures were mentioned. If there is an outstanding characteristic of avian tuberculosis it is the enormous number of bacilli found in the lesions. In the absence of the cultivation of the bacillus from the lesions, these cases must be considered as lacking authenticity.

Indeed, from the variety of symptoms and lesions described in the few authentic cases one is inclined to conclude that there are no certain surgical and pathological findings.

Gloyne,³ who has reviewed the work of Branch, states that clinical diagnosis of infection by the avian bacillus is impossible. Branch gives a number of symptoms such as " (1) long continued intermittent fever, with enlargement of the spleen, metastases in skin and lymph nodes (a type which may be confused with Hodgkin's disease or, as Löwenstein suggests, with leukaemia); (a) cutaneous lesions of four different types—(a) an aphthous septicemic form with changes in bones and joints; (b) a sarcoid form; (c) a gumma-like lesion; and (d) a local ulcerous form, the ulcers tending to heal and recur (the differential diagnosis here lies between syphilis, atypical tuberculosis, sporotrichosis or even leprosy); (3) a urogenital form in which a rapid disappearance of the bacilli following treatment with avian tuberculin has been reported."

Bacteriologically, the great diagnostic points are cultures and the inoculation of suitable animals, such as fowls and rabbits. It is suggested that as guinea pigs are more used than any other laboratory animal for diagnostic purposes, some cases of avian tuberculosis may be missed, as this animal shows slight or no susceptibility.

The tests with avian tuberculin are in some instances found to be extremely sensitive—up to 1:100,000 dilution—while old tuberculin gives a feeble or no reaction in such cases. A serological classification has also been developed by employing agglutinin absorption tests with antigens of avian tubercle bacilli.

No evidence as to the portal of entry has been determined in any human case, but the digestive tract seems to be the most logical route except in some of the skin cases occurring in those working with poultry. In birds the route of infection is typically alimentary.

The evidence indicates that the avian tubercle bacillus occasionally is found to be infective for man, but practically, as far as the writer has been able to determine, the danger is very remote. Since apes and monkeys are highly resistant to the avian bacillus, it is not unreasonable to expect a similar resistance in man.

It seems a pity, in fact it is reprehensible, that cases have been reported without adequate bacteriological study. Such cases as seem authentic indicate that the avian bacillus in man produces a low grade infection, but there are few reports of autopsies, and from a rather extensive study of the literature, one is justified in doubting the correctness of a number of the reported cases and in speaking very cautiously about avian infection in human beings.

NOTE: The study by Branch was made with reference to the reported association of the avian organism with Hodgkin's disease.

REFERENCES

1. Branch, Arnold. *Arch. Path.*, 12:253-274, 1931.
2. Mayo, C. H., and Hendricks, W. A. *South. M. J.*, Jan., 1926, p. 29.
3. Gloyne, S. Roodhouse. *Bull. Hyg.*, 8, 1:39-43 (Jan.), 1933.

The Open Forum

REGINALD M. ATWATER, M.D.

Executive Secretary, American Public Health Association

THE WIDE OPEN SPACES

THE Executive Secretary spent the month of July in the territory of the Western Branch of the Association. The annual meeting of the Branch was held in Helena, Mont., July 1-3 under the Presidency of Walter H. Brown, M.D. An excellent program was provided and the attendance was good. Altogether there was a splendid meeting which centered quite largely on some of the special problems of the West, like Rocky Mountain spotted fever, rodent plague, and tularemia. One of the outstanding features of the program was the report by the Committee on Health Education of the Branch. The section of this report dealing with radio will appear in the October issue of the *Journal*. It is a fine example of what can be done by such a committee of a Branch.

Following the meetings in Helena there was an inspection trip to the Rocky Mountain Laboratory of the Public Health Service at Hamilton, Mont., where R. R. Parker, Ph.D., explained the special work of the Laboratory and the preparation of the vaccine against Rocky Mountain Spotted Fever.

Any who may have had doubts as to the necessity or the desirability of a Western Branch would have found their doubts removed had they been at Helena. With such a meeting it becomes possible to make available much of inspiration and information to public health workers who otherwise would be unable to attend so stimulating a meeting in their professional field. The new president of the

Western Branch is W. F. Cogswell, M.D., State Health Officer of Montana. The President-elect is H. E. Young, M.D., Minister of Health of British Columbia. The next meeting of the Branch will be held in Vancouver, British Columbia, in 1936, in conjunction with the Canadian Public Health Association and several other related organizations.

AN IMPORTANT DOCUMENT

THERE is a continuing interest in the Reports of the Committee on Professional Education mentioned in the *July Journal*. These reports will be presented for consideration by the Governing Council at the Milwaukee meeting. The reports cover the subjects of professional qualifications for health officers and public health engineers. Prolonged consideration has been given to these topics for several years and the present committee under the Chairmanship of W. S. Leathers, M.D., has put much effort into these reports. There is considerable difference of opinion manifest to date and it is to be hoped that a proper group judgment can be reached in Milwaukee. By order of the Executive Board, copies of these reports as they will be submitted to the Governing Council are available on request from the Executive Secretary.

HEALTH COUNCILS IN ACTION

AMONG the Health Councils which I visited this summer, that in Tacoma, Wash., stands out, partly because it is very new, and partly because it has made striking progress since its

organization less than a year ago. A health survey was awarded Tacoma in 1934 in the City Health Conservation Contests and Carl E. Buck, Dr.P.H., made the study during the fall, recommending among other things the formation of a Health Council. An inclusive group of agencies was brought into the organization, and the account of the work so far shows that the official health department has been vastly improved by coöperative effort and the school health service has been raised to a new level. The Junior League has found the right person to serve as organizer of information on health topics for 450 local clubs and a surprising effect can be seen in making the city health conscious. A very interesting development has been the creation of classes in public speaking for local doctors and dentists with the aim of making these professional people more effective in educating the public. Along with this has gone a very comprehensive study of medical economics so that Tacoma need not depend on estimates made elsewhere in this important field.

Always on the alert for new possibilities, the Tacoma Health Council has established relationships with the Tacoma Fair Association so that there is available not only space for an exhibit of their health council activities, but there has been placed in the hands of the Council a complete censorship over all the Fair exhibits so that it will be possible to eliminate undesirable publicity and to exclude pernicious advertising on health subjects. I hope to see many cities take the initiative in this manner.

A SIGNIFICANT BIRTHDAY

THE year in which the Committee on Administrative Practice celebrates its 15th anniversary has been marked so far with many requests for health surveys and appraisals of specific activities. It would be indeed gratifying

if the Association were in a position to meet all the requests for aid. It is especially noteworthy that the last 15 years have witnessed a profound change in the attitude of many official health departments which formerly very strenuously resisted any such appraisal and now welcome such a study with great eagerness, knowing from experience that there often follows a very wholesome wave of public support and appreciation.

Based on the 1934 Health Conservation Contests, free surveys have been awarded to Spokane County, Wash., and to Louisville, Ky. These will be completed during the fall by the staff, and several other localities will also be surveyed.

The Second Rural Health Conservation Contest and the Seventh City Health Conservation Contest have been announced. Field work has begun and particulars may be obtained from Dr. Buck.

WHAT OF FEDERAL AID?

IT is of great significance that the federal government has embarked on a much expanded program of federal aid to states for health services. As I watch the preparations over the United States for these new funds I am impressed that it still remains to be seen whether these very large resources are going to lift the level of professional public health or whether these funds are to be used in devious ways of partisan politics where chicanery and guile will replace the widest service to the greatest number. I am sure in advance of some areas where these funds will be wisely used, where broad public interest will transcend all considerations of private profit. In these areas the essential difference goes back to the kind of people who will administer the funds in these states. I celebrate the advantages of high minded leadership in such critical times!

CAN WE MEET THE NEED?

THESE new federal funds also throw into relief the need for more persons with high professional qualifications and I am pleased to see how thoughtfully plans are being laid for training courses for medical, nursing and engineering personnel. Whatever conclusions may eventually be reached about the required length of graduate instruction courses in public health, there must be agreement that the new personnel in this field will be much better off if they can be exposed in classroom and field to those with high professional standards. Even if these courses now must of necessity be short, there is a fine opportunity for the university departments already giving these courses to extend their influence and by this means to advance greatly the cause of good public health work.

Surely the opportunity for service which faces the American Public Health Association was never greater. It is my earnest hope that this Association may live up to the possibilities of these new days and through its many activities may add new strength and support to the busy hands of those professionally engaged in promoting our public health.

EPIGRAM

"While public health is the foundation of the happiness and prosperity of the people, and its promotion is recognized as an important function of government, how wide is the gap between what is achieved and what might be realized; how inadequate is the understanding of the public concerning the means adopted to secure the best results."—*William H. Welch.*

Coming—in the October Journal

From the Western Branch Meeting:

Campaign Against Tuberculosis in College Students

By Charles E. Shepard, M.D.

Health Information on the Air

By Alan Blanchard

The Relationship Between the Electrophoretic Migration Velocities, the Virulence and the Types of the Diphtheria-like Bacilli

By K. Pierre Dozois and K. F. Rauss

An Experimental Critique of the Allen Method of Evaluating the Bactericidal Action of Antiseptics

By Keith H. Lewis and Leo F. Rettger

New Germany Teaches Her People

By H. E. Kleinschmidt, M.D.

PUBLIC HEALTH EDUCATION*

Much Wanted at Milwaukee—A request for various types of materials, as well as program features for Milwaukee, has been circulated quite widely.

If a copy failed to reach you will you please write promptly to the New York office of the A.P.H.A.?

Possibly as Never Before—This year those who are doing any form of health education, of presentation and of interpretation of public health, need the inspiration of the Annual Meeting.

Nothing can quite take the place of what may be gained through meetings, "lobby conferences," and health education headquarters.

Here's looking for you!

Please Make It Your Headquarters—Public Health Education Headquarters will have space and equipment at Milwaukee to make it attractive and helpful to all concerned.

Please make it *your* headquarters. Come early, and come often. Make yourself known to those you will meet. Have questions to ask. Bring a full quota of ideas of your own.

There will be demonstrations and other events. Get a time table. Electrical transcriptions, amateur and other 16mm. movies, strip films will be demonstrated. Several group consultations will be held. Other features are hoped for.

The editor of this department serves as chairman of the committee in

charge of headquarters. All readers of this department are invited to help by giving a certain amount of time at headquarters.

"Can It Now Be Told?"—Under this title Dr. D. B. Armstrong reviews a set of problems of almost daily concern to those who participate in health education.

In a 4 page reprint Dr. Armstrong considers when to tell the public, what to tell, and what cannot be told—because it isn't so, or we don't know. Here is Dr. Armstrong's proposed classification of "facts":

I. Assured Health Facts:

- A. Those universally and practically applicable
- B. Those theoretically sound but limited in application because of the imperfections in available methods, doubt as to timeliness, or for other reasons

II. Near Facts:

- A. Those about which there is a growing certainty, though as yet no absolute scientific assurance
- B. Those once generally accepted but about which there is an increasing element of doubt

III. Assured Health Fallacies.

Get a copy from Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y., and re-read it, say, every September?

Preventive Medicine via Talkies—Paul A. Smith, inspector, Southern Berkshire Union Health District, 54 Castle St., Great Barrington, Mass., writes:

In connection with this year's health education activities we have thought of the possibility of using the moving picture as a

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

medium of teaching the public significant facts on preventive medicine. We are confident that the local theatre would be entirely coöperative if we could secure a few short interesting films of 15-20 minutes' duration. The general public now has grown so accustomed to talkies that I feel any films we secure should be of that type.

If you know of any suitable films which might be used, and where they can be obtained, we would appreciate hearing from you.

Our reply to Mr. Smith:

There are almost no talkies on health subjects in so far as we know. Such pictures not only are expensive, but they are difficult to produce.

Please write to the Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y., about what they have.

We hope that publication of your request in *American Journal of Public Health* may bring you additional information.

A Package Library for Physicians—The package library for exhibition in local medical conferences or where physicians congregate "has been completely revised." The library is available for loan through state tuberculosis associations.

The Parent-Teacher Audience—To understand the parent-teacher audience, and to learn what that audience through its local leaders is learning about health, you will wish to see the publications of the National Congress of Parents and Teachers, including its periodical, *The National Parent-Teacher*, 1201 16th St., N.W., Washington, D. C. 15 cents a copy.

Some recent articles:

May, 1935: Adapting food to different ages. Training children for safety. Sunburn or sun tan, by S. J. Crumbine.

June, 1935: Summer-time: a healthy time for babies. Handling the milk question. Rest and sleep in summer, by S. J. Crumbine.

July, 1935: Getting the most out of nature's boom days, by H. N. Bundesen. The road to dental health, by J. A. Tobey.

An effective feature is "It's Up To

Us," a part page lesson for parents which might well be adapted to health teaching. Two pictures contrast the wise and the unwise, each with two or three line dialogue caption, plus a lower paragraph of application.

"I Give and Bequeath"—The convincing editorial which appeared under this heading in the June issue has been reprinted and mailed to members.

This department would emphasize that gifts to the A.P.H.A. render a nation-wide service. And this service reaches into the communities which have well developed public health services, much to their advantage, and at the same time is helping to bring nearer that day when every individual in every section of the country, and of all the North American countries, will benefit by public health services.

Will those who are doing health education make at least one mention of this possibility? Here and there in most communities are those who respond to the vision of a national service. And usually those who can see the larger field will not be any less interested in the local work.

Physicians Protest Radio Censorship — "Physicians Protest Commercial Radio Censorship" heads the statement presented by Dr. W. W. Bauer at a hearing before the Federal Communications Commission, May 15, 1935. In stating the handicaps now existing Dr. Bauer said:

The American Medical Association, while duly appreciating the coöperation of the broadcasting interests, nevertheless is constrained to represent to the Commission that certain practices and situations in the field of educational broadcasting require attention and should be modified if possible in the interest of the listening public.

Speakers on scientific topics are limited in what they may say, with particular reference to the following matters:

(1) Medical speakers on health topics are

not permitted to make general statements of established fact which may interfere with products advertised by radio, even when no specific product is mentioned and when the truth of the proposed statement is not in question. This is entirely aside from specific objections to certain medical advertising.

(2) Speakers are limited with respect to certain topics, particularly the important public health problem of venereal diseases, by virtue of a public taboo on mention of these topics. It is recognized that this taboo is not a creation of the radio industry, but is merely reflected by that industry. Nevertheless, it puts a great handicap in the way of public health progress. The so-called social or venereal diseases, and particularly syphilis, constitute, in the opinion of many competent observers, the most important public health problem before the United States today.

(3) Radio speakers are required to accept censorship from the owners of broadcasting facilities or incur the penalty of being barred from the air.

Dr. Bauer submitted four points which he hoped would be adopted by the Commission. In *Education By Radio*, National Committee on Education by Radio, 1201 16th St., N.W., Washington, D. C. July 11, 1935. *Free*. This little publication and this organization lead in the campaign for protection of the educational use of broadcasting. Ask to be put on their mailing list if you wish to keep in touch with developments.

No Restrictions in Ohio—Dr. A. L. Van Horn, chief of Bureau of Child Hygiene, Ohio Department of Health, Columbus, reports as follows:

For the past 3 years the State Department of Health has sponsored a weekly broadcast over station WOSU, which is owned by Ohio State University. During this time no restrictions whatever have been placed on subject matter and although no complete broadcast has been devoted to the subject of venereal diseases, still we have made frequent references to syphilis.

Recently we have expanded our health education program by radio to include three other Columbus stations (WBNS, WAIU and WCOL) so that we are now on the air 4 days a week.

Many Names for a Single Process—A process of reproduction for health education material, not widely used by health agencies, offers valuable possibilities. It is especially good when a pamphlet or other publication is to be reprinted. It offers the possibility of using a variety of ready made photographs, or sketches without making engravings. Typewriting can be substituted for printing type text.

We would like to hear from readers as to their use of this process.

Inland Printer, 205 W. Wacker Drive, Chicago, Ill. (May 1, 1935: 40 cents) considers the subject from the standpoint of the printing trade, but several paragraphs will be helpful to laymen:

. . . the confusion of names under which the business operates—planographing, offset printing, photolithography, offset lithography, not to mention the various special names coined by individual concerns, such as "planoprint," "photolith," and so'on. . . .

The word "planographing" refers to printing done from a plane surface, as distinguished from relief printing, where the letters and pictures stand out from their bases, and intaglio printing, wherein the letters and pictures are cut into the printing surface. The distinction is akin to that of birds, animals, and worms, one of which is above the earth, one on the earth's surface, and one underneath.

We might say that lithography in general is one form of planograph printing. As actually used, however, planographing has a far more restricted meaning. It refers to printing by offset, wherein simplified lithographic technic is used to do simplified types of work, most of them in black and white, many of which were previously done by letterpress. . . .

One of the biggest sales problems that offset printers have is to sell buyers of printing on using big pictures, action photographs, striking charts and graphs, and generous pen-and-ink illustrations. The general objective is to get printing buyers to tell more of their stories pictorially and graphically, and so reduce the number of words that need to be written and set in type.

The article warns the printer against "overselling" the cheapness and other

elements which need to be considered. Consultation with a reliable printer will meet these difficulties. Any process has its limitations.

Where to Get This Information?

—Here is one of the many letters asking for information difficult to supply:

I shall greatly appreciate it to have a list of recent health films suitable to public health educational purposes. I should like to know the title, the size, and length of film, the producing agencies, and the cost of securing the rental of it.

I shall also appreciate to have your recommendation concerning popular health educational literature available from private agencies. What is available from the various sources, and what among this material is worth while.

No satisfactory answers are known to the writer, and no satisfactory sources of information.

Who should undertake the job?

Who will undertake the job?

Health Education in July, 1935, Journal—In *American Journal of Public Health*, July, 1935, are valuable references touching on health education.

In "Significant Aspects of a Recent Official Survey Concerning the Household Use of Milk in Philadelphia," by Egbert, pages 789-795, is a quotation from the study:

A relationship between publicity and increased milk consumption seems clear, but it cannot be concluded that it is a "cause and effect" relationship. The causal relationship may run from high consumption to knowledge of publicity, rather than from publicity to increased consumption.

Emphasizing the need for increased efforts to extend the use of milk the author says:

Too much credit cannot be given to every organization and agency that has had a part in the splendid educational work already done, and in aiding them and others to continue and increase the efforts they have made.

In "Function of the Laboratory

in the Epidemiological Control of Syphilis," by Arthur, pages 845-847:

We believe that the public is developing a better understanding of the disease and that the great value of early diagnosis and prompt treatment is more generally recognized. Recent publicity even in the newspapers and by radio, with many favorable comments, shows a growing interest. Health officials should be cognizant of this slow but apparent change in attitudes and make every effort to profit from it by progressing beyond the present more or less inactive statistical period to a more active epidemiological endeavor in the control of syphilis.

In "Industrial Health: An Expensive Neglect," pages 858-859, there is emphasized a field for health education of the worker, the public, and the legislator.

In "The Bulletin of Hygiene," page 860, attention is called to invaluable source material.

"The Contests" in "The Open Forum," page 862, refers to the publicity value of the Health Conservation Contests.

There is a review of "Recording of Local Health Work," by Walker and Randolph, page 876, a book of great interest to those who use record data in any form of publicity.

We hope that readers of this department note each month under "Applicants for Membership" those listed for Public Health Education Section. Some of us might feel inclined to send notes of welcome, and an invitation to participate in Section sessions at the next convention.

Hygeia for August, 1935—We wonder if the following articles in *Hygeia* might not suggest topics for radio talks:

Typhoid. Abscessed ears and mastoiditis. When children and animals mix (diseases of pets). Some popular fallacies about anemia. The curious thing called allergy. Balm at the door (tale of a medicine peddler and a country doctor). Nervousness: its causes and prevention. Foods in hot weather. Why the baby has eczema. Trained dogs guide

the blind. Heart disease after middle age. Theobald Smith (a pioneer scientist). Why should your child dance? Primitive medicine (among the Zulus). Decisions as to iodized salt. Injuries and first aid to the eye. Diet and the teeth. "Jake paralysis." On the feet of little children (right shoes and stockings). New Books on health. Questions and answers.

Under "School and Health":

Thinking straight about health. Some fun with superstitions. Solving health educational problems. New health books for teachers and pupils.

A Round Table on Health Education—At a recent meeting of the Advisory Council of the Milbank Memorial Fund one session was devoted to health education. From the report by Dr. Kendall Emerson we quote several paragraphs:

With our democratic tradition we can assume that the aim of education includes at least enlightenment, the promotion of careful thinking, and the creation of a critical attitude toward the problems each generation has to face.

Thus health education aims to enlighten the individual and the community on problems of public health and preventive medicine so that to an increasing degree reason can determine actions and decisions in this field.

Efforts to modify human attitudes and conduct with respect to health fall into two categories. One consists in *teaching* the latest developments in public health; the other in *promoting* certain health measures which the individual has to accept on faith. This raises the question whether health departments in their educational programs *urge* too much and *teach* too little, and if so, whether it is feasible for a health department to do more in the line of real teaching via the medium of adult education groups.

A comprehensive health department educational program should cover at least two phases: (1) popular health education, and (2) health education for professional groups. Schools health education is omitted, for usually this is considered the function of the school authorities.

The objectives of a well rounded program of popular health education are: giving the community a general knowledge and understanding of the work of the official health

agency; educating the public concerning health conservation, disease communication, and methods of safeguard; securing desirable changes in public opinion; creating a desire for new facilities; and educating the community to utilize the services of private physicians or, when financially unable, of clinics or hospitals. . . .

Some subjects should receive continuous emphasis throughout the year. For others intensive drives are the most effective.

Material used must have scientific accuracy, emotional appeal, concreteness, and simplicity.

The report notes some questions raised in the discussion, with a brief statement of the conclusions on each question.

Is health promotion the primary purpose of a health department educational program?

Should a health department do more in the nature of real teaching through organized adult education classes?

Considering that the major causes of present-day mortality center around heart disease, cancer, pneumonias, and accidents, can any health department divest itself of the responsibility of carrying on educational work in these fields?

What should be the policy of a health department in using commercial literature?

Are the present radio programs arranged by health departments effective?

Would it be practicable to prepare miniature exhibits of health department activities?

The discussion seems to have been largely in terms of the big city.

In "Policies and Procedures in Public Health," Milbank Memorial Fund, New York, N. Y.

School Health Bibliographies—The following bibliographies were revised in June, 1935:

"Health Education in Elementary Schools." For classroom teachers.

"Health Education: For Administrators and Instructors of Health Education in Junior and Senior High Schools."

"Health Education in the Rural School."

"Problems of Administration in School Health Education."

The following were revised at dates indicated:

"Some References on the School Lunch." April, 1935.

"Some References on Child Care and Training for Those Conducting Child Care Classes in Secondary Schools or Parent-Teacher Groups." Jan., 1935.

"Some Recent Contributions to Health Education." For those giving courses in health education. Oct., 1934.

"Some References on Dental Health Education." Oct., 1934.

"Supplementary Reading Materials for Health Education." Grades 1 to 9. June, 1934.

"Health Plays for School Use." Feb., 1933.

Apply for any of the above to American Child Health Association, 50 W. 50th St., New York, N. Y., *before October 1, 1935.*

These lists might well be studied by anyone preparing reading references for students, health workers, teachers, or others. The information given and the form in which it is presented are almost ideal. Surely such lists mean more and better reading by students and workers.

"A Prime Function of a Health Department"—"My editor and I agree that one of the prime functions of a health department (and when I say health department, the term includes the tuberculosis organization) is to keep the public informed regarding the activities of the organization," said City Health Officer R. L. Carlton of Winston-Salem, N. C.

Dr. Carlton, speaking before the Southern Conference of Tuberculosis Secretaries, said that this informing of the public

... can best be done through the medium of the newspaper by describing in readable, simple English those services which affect the common citizen in his daily life. There is no universal prescription as to how to present this picture. The people of one city may demand the sensational and unusual. However, the health worker is never justified in sacrificing accepted and proven facts for the sensational and startling portrayals of unproven and doubtful origin. He is most

successful who can mix the dry language and statistics of the scientist with the highly colored portrayals of the modern commercial advertiser. We can't all do this, of course—but that is an ideal toward which we should strive. . . .

There is no lack of material for news articles. In addition to stories of the department's activities there are never ending stories of communicable disease. When it is considered that 1 out of every 25 persons in the community had some form of preventable disease last year, that every one has a friend, an acquaintance, a member of his family, or a relative who contracted a communicable disease—a preventable disease—and was absent from school, work, or activities on account of it—we must concede that public health publicity is news. Stories regarding communicable diseases are current news if made timely. We did not submit articles on summer care of babies in December; nor write vacation hints in January; we did not discuss green apple tummy ache or like food indiscretions at a time when there were no green apples, but we made our stories timely, of interest to our people because concerned with things and conditions at hand now, today, not 6 months from now.

All life is the source of public health news for the health worker who wishes to utilize it. He can begin before the child is born with stories of prenatal instruction, and follow with articles dealing with the care of babies and tell of their troubles of the horrid "second summer," of the wrong ideas so many mothers have concerning the teething bugaboo, stories of how to feed and clothe and exercise the baby and how to prevent rickets and how to give him a sunbath and what not—and a dandy piece of publicity is the story of the well baby health station and of what mothers learn to do for their babies' welfare there. Publicity can stress the protection of babies and children against smallpox and diphtheria and typhoid; it can emphasize the prevention of many other diseases; it follows with stories of the preschool child and tells what happens on account of neglecting him; then getting him ready for school is the subject of more than one news story; followed with a host of stories as to what should be done in a health way for the child in school. Periodic health examinations are entitled to some publicity. The correction of defects in children and adults can always be used as the subject of an interesting story. Early diagnosis and treatment are to be stressed. The fight against tuberculosis has only been half won and this story is applicable everywhere—not forgetting the story

of the tremendous inroads this disease makes on our young adult population. The eradication of tuberculosis from cattle and its relation to the reduction of the disease in humans is an item of interest. The family medicine chest with its simple remedies and dangerous poisons in careless array; spring and fall house cleaning, sprinkling of streets, sewage disposal, quarantine laws, school inspection, the value of public health nursing, nutrition with a dozen stories regarding the foods we should eat and how to choose them, and so on through a host of other aspects of community health and personal hygiene.

Through such publicity the health department is able to warn the community of outbreaks of communicable disease and it is able to broadcast information so the public may know when to call a doctor and what to do in a given emergency.

Watchman! What of the Night?
—Several months ago a number of topics were briefly formulated in the hope that some of them could be discussed by the Section Council of the Public Health Education Section, or by the Section at the Annual Meeting.

These topics are submitted merely in the hope that local health councils, or other state and local groups of public health workers will give consideration to some of them.

Naturally we would welcome written comments for publication in this department of the *Journal*. Some readers may care to criticise or to re-word some of the proposed topics.

1. Professional ethics as touching the endorsement or sponsorship of organizations largely subsidized by commercial firms and either (1) openly acknowledged, or (2) not openly acknowledged.

2. Professional ethics in the public endorsement of a specified product—as in a radio talk.

3. Standards in the acceptance of health education material from commercial sources for (1) use with adults, (2) use with children, (3) as background material for the more or less discriminating classroom teacher.

4. Ethics and professional responsibilities in accepting membership on non-functioning committees, that is, where committee participation is merely nominal, the work of the committee being largely done for it without its members taking real responsibility in thinking out what is done or said.

5. How should the Public Health Education department of *American Journal of Public Health* handle publications issued by organizations largely subsidized by commercial firms, which fact is not openly acknowledged—with additional reference to such a combination when the organization advocates health practices, *not* scientifically accepted as true, but which further the business of the financial backers.

6. What procedures and what sources of authoritative help can be offered to health workers and to teachers for guidance in the selection of materials for adult or child teaching purposes?

7. What are some tests to be applied by public health workers when asked to serve on apparently ethical projects—such as a health exposition under commercial management—a new committee or other group for a public health purpose—and so on?

8. When may a health department or health association reproduce printed matter, radio talks, or other material already produced by another agency—what procedure should be followed—and what open acknowledgement of the source should be made?

9. What standards may be set up, on the basis of what we now know, by which a health worker may partially evaluate his health education methods and materials (that is, there are certain accepted elementary standards for reasonably good printed matter which might be set up for the printed matter of the health agency).

10. What is a public health education program? How is it different from a list or description of the activities or the materials used the past year or proposed for the coming year? In what way is the public health education program different from but a part of the program of public health activities, functions, services, or objectives of the health department or health association?

11. Is a united front or coöperative or co-ordinated or non-competitive health education program possible when there are two or more state-wide or city-wide health agencies, public and private, in a given territory? What are some of the recognizable difficulties? Should any one health agency in the state or city be accepted as the leader—and how should that leadership function?

12. Are private health agencies, in the effort to secure financial support, making unfair or unwise comparisons between the work of private and public agencies?

13. Are there any elementary tests which could be applied to our health education work in any of its phases or details?

14. When there is no staff member

specializing on health education—when, for example, it is stated to be the personal responsibility of the health officer—how under such circumstances will the health officer actually do health education—and *what* health education may he be expected to do?

15. Could we offer some tentative statements as to what skills or experience a man or woman should have, even when he is serving merely as a helper to the health officer who is credited with the doing of health education?

"They Do and They Don't"—So writes W. W. Bauer, Director of Bureau of Health and Public Instruction, American Medical Association.

They do and they don't. We have in our file a clipping from the *Chicago Tribune* for April 18, 1935, in which the word syphilis was not only mentioned, but headlined in connection with a meeting of the Illinois Social Hygiene Association. I am informed, though I do not have the clipping to verify, that the *Tribune* published an editorial on that subject in the same issue or perhaps a day or so later. In a clipping from the *Syracuse, N. Y., Post Standard*, March 27, 1932, entitled "Social Hygiene Vital Problem," syphilis is mentioned several times.

In the *Chicago Tribune*, April 28, 1935, appeared an article under the heading "Syphilis in U. S. on the Increase, Doctors Assert."

I am also in possession of radio talks dealing either with syphilis or gonorrhea which have been delivered over the following stations on behalf of medical societies. The figure in parentheses following the name of each station indicates the year in which the talk was broadcast:

WTIC, Hartford, Conn. (1931-32)
WBZ, Boston (1930-31-32)
WHAM, Rochester, N. Y. (1934)
WGY, Schenectady, N. Y. (1932)
WCAE, Pittsburgh (1934)
WBBM, Chicago (1930-32)
WJJD, Chicago (1931-32)
WGN, Chicago (1932)

In giving you this list I wish to assure you that I have no idea that it is complete, since there may be others; these are the ones of which I have definite knowledge.

Knoxville Has Heard about Syphilis—Health Officer Enneis, Knoxville, Tenn., sends a clipping from *Knoxville News-Sentinel*, dated June 6, 1935, with headlines as follows:

Syphilis heads list in number of cases here. Measles come second in contagious report and then follows gonorrhea.

Bureau urges sane view.

"Conspiracy of Silence" held responsible for failure to check ailments.

Then follows this news story:

More cases of syphilis were recorded at the City Health Bureau in 1933 and 1934 than any other communicable disease, according to a recently issued report.

Gonorrhea came third in the number of cases, exceeded slightly by measles.

"A combination of circumstances accounts for this condition, the most important of which has been termed 'the conspiracy of silence' regarding the disease," says the report in regard to syphilis. "It is frequently considered the result of one's own misconduct.

HALF ARE INNOCENT

"As a matter of fact almost half of the total cases are innocently acquired marital infections and congenital syphilis.

"Weapons are already available with which syphilis might be reduced from a major to a minor problem.

"Educational campaigns against syphilis and gonorrhea are too often met with rebuffs. To be attacked effectively these diseases must be brought out into the open, frankly discussed, and fearlessly fought."

HOUSEWIVES IN MAJORITY

A classification chart included in the report, shows that in the 2 year period, 75 housewives in the age group from 20 to 49 years had syphilis as compared with 53 prostitutes. The chart shows 62 had syphilis as compared with 53 cases among female servants.

The increase in syphilis is accounted for by treatment of transients by the clinic, treatment of infected women at Camp Home, and discovery of many cases during examination of food handlers.

Dr. Enneis writes:

A few years ago this same paper published a series of articles on syphilis and gonorrhea and one article that I have on file has a headline covering three columns, in which syphilis is mentioned. I have never heard of any adverse criticism locally on account of this kind of publicity.

HEALTH EDUCATION

The references below have appeared in *Library Index*, a weekly index to

current periodical literature in the field of public health, issued by National Health Library, 50 W. 50th St., New York, N. Y.

Armstrong, D. B., M.D. Can it now be told? *Journal of Health and Physical Education* (Ann Arbor, Mich.) 6:5-8, June, 1935.

Conrad, H. L. Historical steps in the development of health education. *Mind and Body* (New Ulm, Minn.) 42:79-81, May-June, 1935.

Whitney, A. W. Progress in safety education. *Nation's Schools* (Chicago) 15:33-35, June, 1935.

MAGAZINE ARTICLES

This department will welcome from readers criticisms of popular articles on health topics, whether listed under this heading or not. In view of the wide reading given to many such articles it seems important that we record valid objections to any of them.

"The Radio Nostrum Racket," by R. L. Strout. *Nation*, 20 Vesey St., New York, N. Y. July 17, 1935. 15 cents. "A startling exposure . . . before the Federal Communications Commission by Dr. Arthur J. Cramp, representing the American Medical Association."

"Shall It Be State Medicine?" by T. Swann Harding. *Christian Century*, 440 S. Dearborn St., Chicago, Ill. July 31, 1935. 15 cents. "State medicine now here"; "individualism within collective system" as now in France.

"Should Medicine Be Socialized?" by Dr. M. V. Leof. *Common Sense*, 315 4th Ave., New York, N. Y. Aug., 1935. 25 cents. Asking for full governmental control and professional autonomy.

"Specter of Paralysis Stalks Carolina." "Science has weapons for the battle with this year's poliomyelitis epidemics; new vaccines are undergoing their first critical tests." *Literary Digest*, 354 4th Ave., New York, N. Y. July 20, 1935. 10 cents.

REPORTS

Interesting is the fact that so many health department reports continue to be issued without table of contents or index, thus limiting their usefulness both to general readers, and to fellow health officials and research workers.

The 20th annual report of Department of Health for La Salle, Peru, and Oglesby, at La Salle, Ill., devotes nearly two pages to the record of what "Coöperating Agencies," including organizations, professional groups, and others, have been doing for public health in those communities.

FOR EDUCATION OR REFERENCE

Usually state and local health agencies will supply sample copies of their materials to health workers, but never expect them to send free copies for distribution outside of their respective territories.

Better times and the birth rate; appendicitis and hospital facilities; the comparability of cancer death rates; health record for May, 1935. In *Statistical Bulletin*, Metropolitan Life Insurance Co., New York. June, 1935.

"Children's Bureau and Other Publications Relating to Children." Supt. of Documents, Washington, D. C. Free. List of publications for sale.

"Conservation of School Children's Eyes," by Dr. A. C. Snell. Reprint. Rochester and Monroe County Committee on Eye Conservation, Room 304, 277 Alexander St., Rochester, N. Y. Originally a radio talk.

"Healthy Hearts" is a reprint from *Hygeia* of 4 articles; 16 large pages; 10 illustrations. American Medical Assn., 535 N. Dearborn St., Chicago. 15 cents; less for 25 or more copies.

"The Health-Protection Aspects of Convention Planning and Operation: Selecting the Convention City: Some Precautions to Observe," by H. N. Calver. *World Convention Dates*. 333 W. 42d St., New York. May, 1935.

"Highlights from the Nation's Accident Experience in 1934." Press material on traffic, occupational, public, and home accidents. National Safety Council, 20 N. Wacker Drive, Chicago. *Free.*

"A Project in Rural School Health Education," by R. E. Grout. Home-School Relationships. Milbank Memorial Fund, 40 Wall St., New York. A reprint.

"Skin Hazards in American Industry." One of the many scientific contributions of U. S. Public Health Service. Supt. of Documents, Washington, D. C. 54 pages. *10 cents.*

"Summer Camps: 1935." Boston Health League, 43 Tremont St., Boston. Camp standards; examination forms.

"The Venereal Disease Problem in the Colored Population of Baltimore City," by F. O. Reinhard, M.D. Reprint. City Health Dept., Baltimore, Md.

"A Veteran Volunteer State Sanitary Association," R. G. Patterson. Reprint. Ohio Public Health Assn., 72 S. 4th St., Columbus. About the Ohio State Sanitary Assn., 1880-1890.

American Social Hygiene Assn., 50 W. 50th St., New York, offers new folders: "Syphilis," "Gonorrhea," "For Expectant Mothers," "The Truth About Syphilis and Gonorrhea," and "The Medical Charlatan" (exploiter of the sick, well, ignorant, credulous). *\$1.00 per 100; \$5.00 per 1,000.*

Massachusetts Dept. of Health, Boston, has issued:

I Don't Want Diphtheria (4-page folder).
What's and Why's of Cancer (8 pages).
For Your Teeth and Gums (leaflet on diet).
The Care of Your Teeth (2-page leaflet).
Healthful Living for the Teens (4 pages).
A Message to Dog Owners (a slip urging antirabic injections).

Agencies Supplying Health Bulletins, Leaflets, Posters, Films (5 mimeographed pages).

TIMELY TOPICS

The Department of Agriculture, Washington, D. C., and most state agricultural colleges will supply material on pressure canning which seems to have increased importance these years when many more people are canning fruits and vegetables. The Bureau of Home Economics recently announced that

Modern canning science says in no uncertain terms, "You can process fruits and tomatoes in the boiling water bath but you *must* can nonacid vegetables under steam pressure if you want wholesome products that will keep."

See also "Proper Processes for Home Canning," by F. W. Tanner. *J.A.M.A.* May, 1935.

Insurance companies and other safety centers issue pamphlets and placards on the prone pressure method of resuscitation from electric shock, drowning, or asphyxiation. Thus the use of this material is timely all the year round.

"Diving Helmets Are Dangerous Toys," by F. C. Mills. *Scouting*, 2 Park Ave., New York, N. Y. July, 1935. *15 cents.* A new summer safety hazard, and what to do about it.

BOOKS AND REPORTS

French Medicine—By *M. Laignel-Lavastine* and *M. Raymond Molinery*. Translated by *E. B. Krumbhaar*, M.D. New York: Hoeber, 1935. 168 pp. Price, \$2.50.

This interesting book is another of "A Series of Primers in the History of Medicine" under the general title, "Clio Medica." Written by Frenchmen, it has been translated and edited by Dr. Krumbhaar, who has done an excellent piece of work and given a number of informative notes.

An introduction gives a short outline of what will follow; then comes the description of the first civilizing wave in Gaul, which began on the shores of the Mediterranean as a development of Phoenician, Aegean and Greek civilization, and carried matters from curative magic to the Gallo-Roman development. The Christian religion fostered curative magic to the detriment of scientific medicine. Indeed, the Church recognized the diabolic or malefic origin of certain diseases which must be exorcised. In the Gallo-Roman period which followed, the Hippocratic writings were carried throughout the Greco-Roman civilization by the power of the Roman Empire. This period was made notable by the birth of Galen in the 2nd century, A.D.

Public hygiene made astonishing advances. Ancient Rome had 14 aqueducts carrying water into the city. There were more than 800 public and private baths, and through the wars of conquest there was brought about the widespread establishment of thermal resorts. The development of military medicine in this period was remarkable, and the discovery of military

hospitals shows that the sanitary service was well done even in the provinces.

There developed specialists such as oculists, otologists, dentists, gynecologists and fistula specialists. The authors feel that it is depressing that such a marvelous civilization, whose hygienic legislation has not been equaled in 20 centuries, should have been annihilated by the invasion of barbarians, and hold that the new wave of Western civilization has not yet acquired an equal perfection in certain directions.

In the third chapter we have a description of the beginning of French medicine from Clovis (465–511 A.D.) to Charles VIII (1470–1498). During this period there was a great development of hospitals brought about by the fight against leprosy on the one hand, and the application of the parable of the Good Samaritan on the other. The first French hospitals were erected along the pilgrimage routes. There are bad reports concerning the hygiene of some of these hospitals, but the authors defend many of them against the attack, and point out that at the Hôtel Dieu of Paris, 1,300 brooms were used up annually. By the 16th century the hospitals for lepers which had played such a large rôle, had very few lepers, as the disease had become rare, and in 1543, Francis I ordered the segregation of the lepers at the leper hospitals of the kingdom.

With the invasion of the barbarian hordes who destroyed the Roman Empire, civilization found refuge in the monasteries, which hastened the advance of science, but the inroads of so-called religion which became superstition, did much to hold back the scientific development of medicine.

Successive Councils forbade the clergy to spill blood, and thus brought about the separation of medicine and surgery. They decreed the incompatibility of medicine and religion, which, combined with the obligation of celibacy, turned away many pupils.

In the Middle Ages medical instruction was largely clerical, many doctors having been at first theologians. There were monks who concerned themselves with bookish medicine because they met with it in the manuscripts they read.

The School of Montpellier was founded about 738 and resembled the School of Salerno, the influence of which was noteworthy for the introduction of the lay spirit into medieval medicine. Medicine was taught at Paris in 1180. The library of the Faculty of the school in Paris was founded in 1391, and up to 1555 many gifts and purchases are recorded. Unfortunately a long decadent period began about this time which was only cleared up with the Renaissance. The faculties of Bordeaux, Lyons, Strasbourg, Nancy, Lille, Algiers, and Marseilles are described separately.

The history of the Renaissance is particularly interesting. Rabelais is given the most prominent place in medicine and Ambroise Paré in surgery, though he was far more than merely a surgeon. The further history of medicine in France is taken up by centuries, and sketches of many of the men who have made medical history are given, with illustrations.

We wish it were possible to give a longer review of this delightful work, but it must be read to be appreciated. It is well printed and has few mistakes. However, on page 2, second paragraph, Chapter II is referred to twice, whereas the second reference should be to Chapter III. We would suggest also that the dates should uniformly be given along with names. For example, Chapter III covers from "Clovis to

Charles VIII," but we suspect that many, even historians, will not be able to give off-hand the date of either of these men.

Altogether the book is heartily recommended. MAZŮCK P. RAVENEL

Emotions and Bodily Changes—By H. Flanders Dunbar, M.D., Ph.D. New York: Columbia University Press, 1935. 595 pp. Price, \$5.00.

In this carefully indexed volume, with its bibliography of 2,251 titles topically arranged, Dr. Dunbar not only presents an invaluable survey of the literature on psychosomatic relationships published in the years 1910 to 1933; she interprets the trends of medical and psychological thought in a manner which makes the book of vital importance to everyone concerned with the many phases of the problem of maintaining and restoring health.

The book is divided into three parts dealing, respectively, with orientation and methodology, comprising problems of integration and differentiation, problems of acute and chronic illness, and problems of measurement; organs and organ systems, devoting one chapter to general considerations and eleven chapters each to a specific system; and therapeutic considerations and concluding remarks.

Space permits only a summary of the general conclusions. Dr. Dunbar finds that the organismal theory, elaborated especially during the last 20 years, in biology and medical sciences (involving a new concept of the organism-environment equilibrium) is fundamental to an understanding of disease processes and is remodeling our definitions of health and disease. This general truth now needs specific factual elaboration in support of the idea of the importance of the organism as a whole, or the organism-environment as a whole. The public health official, the specialist, and the general practitioner who fails to

grasp and utilize this new concept is out of step with medical progress.

"Practically," says the author, "in the maintenance of health, we are coming more and more to realize the necessity for coöperation between physicians, especially those engaged in preventive medicine and public health activities, and specialists in the various aspects of our social organization—educators, clergymen, leaders in industry, etc."

FREDERICK W. BROWN

Science and the Public Mind—By Benjamin C. Gruenberg, with a foreword by John C. Merriam, President, Carnegie Institution of Washington. New York: McGraw-Hill, 1935. 196 pp. Price, \$2.00.

This book is an account of an investigation made by the author into the place of science in relation to adult education and how activities in that field should be stimulated.

It is explained at the outset that "The book represents the interaction of many minds called upon to think aloud on various aspects of the relationships between that vague entity called 'science' and that perhaps even more vague something known as 'the public.'" In preparation for it there were interviews or conferences with some two hundred educators, scientists, publicists, "and a great deal of correspondence with others," including administrators of educational and other institutions. A grant was made by the Carnegie Corporation of New York to meet the cost of the study.

The volume is divided into 3 parts containing in all 16 short chapters with many subdivisions. The first part discusses the place of science in modern life, regarded from the standpoints of the individual's interests, civic and social interests, and our common or cultural interests.

The second part discusses how science can be brought to the public,

including the teacher, the lecturer, the newspapers, radio, and moving pictures.

Part three, called "The Educational Situation," has to do with such topics as the public's changing interests, the failure of science to reach the public, and a summary of findings and recommendations.

In his foreword, Dr. Merriam gives a strong reason for promoting science as a method of thought and a mode of life. He says:

In this connection it is important to note that whatever the ultimate fate of government by the people, the highest success in a system of that type can be attained only by development of a citizenry thinking continuously and effectively according to a pattern which is fundamental in science, namely, one which involves wide and clear vision, recognition of need for continuous inquiry upon great questions, and the settlement of problems on the basis of facts and logic.

Dr. Gruenberg points out that in the last 75 years science has completely changed its place in our common thought. Formerly a great mystery in the hands of a few, science has become—

. . . a dynamic process of scrutiny and research that attacks and transforms every phase of thought and practice. The men and women who make up the active adults of our population must attend to science in one or another of its many aspects, whether they wish or not. And they do.

It is hard to understand how Dr. Gruenberg could have written a book so full of the opinions of so many people on so many details of his subject, and that he has done so well is a tribute to an editorial zeal which must be regarded as remarkable.

The book is written in a clear, crisp and highly condensed style. This is the ninth volume which Dr. Gruenberg has produced on biological or educational topics, not to speak of several of which he has been co-author or editor. He has long been favorably known in public health activities. GEORGE A. SOPER

Essentials of Feeding and Paediatric Practice—By *Henry P. Wright, B.A., M.D.* New York: Oxford University Press, 1934. 212 pp. Price, \$4.25.

According to the preface, this book is intended to serve the needs of the trained nurse, the student of medicine, and the busy general practitioner. It will undoubtedly be useful to all three. The title is too inclusive: pediatric practice is a pretty large field. The most significant part of the book is that devoted to the nutrition of the infant.

A few criticisms occur to one as he glances over the chapters. The balance could be improved. The chapter on clinical and laboratory tests could largely be eliminated; the tests described are not done by the average general practitioner and anyone doing them would naturally turn to larger and more complete special volumes. The chapter on physiology tries to compress too much into too small a space. The chapter on "Rules for Isolation and Exclusion of School Children in Cases of Common Communicable Diseases" is not well advised since the matter of isolation and quarantine is under the control of the board of health, not the general practitioner, and the official rules in any given community may vary widely from those given in this book.

The chapter on therapeutics ought to prove useful for quick reference. There are a good index and several valuable tables, and the printing is good.

This is a useful little book to have on the shelf—along with others.

MERRILL E. CHAMPION

Blood Groups and Blood Transfusion—By *Alexander S. Wiener, M.D.* Springfield, Ill.: Charles C. Thomas, 1935. 220 pp. Price, \$4.00.

One is tempted to refer to this work as a compend of information on the

individuality of the blood for the physician and serologist. The author has adequately considered the historical, practical, medico-legal, genetic, and anthropological aspects of the subject. The importance of using the *International Classification* of blood groups is correctly emphasized. The constitution of and methods for the identification of the four major blood groups as well as the subgroups of groups A and AB, and of the less easily demonstrable groups M, N, and MN, and the little known anomalous groups, are given. The sources of error in the determination of blood groups, the indications and technic of blood transfusions are discussed.

Some fundamental yet elementary principles of genetics and biometrics as applied to the hereditary transmission and frequency of blood groups are given. In view of recent legal recognition of the use of blood grouping as a means of determining parentage, these considerations are especially valuable and opportune.

The book is well written and printed. Numerous references to original literature are included. The material is presented in a very logical and concise manner, although the author assumes that the reader is familiar with the general principles involved in the determination of the blood groups. This book is to be recommended to anyone desiring a concise and authentic statement of facts in regard to our knowledge of the individuality of the blood.

NEWELL R. ZIEGLER

Lactobacillus Acidophilus and Its Therapeutic Application—By *Leo F. Rettger, Maurice N. Levy, M.D., et al.* New Haven: Yale University Press, 1935. 203 pp. Price, \$2.50.

A large part of this book is devoted to the use of acidophilus as a therapeutic agent, and as this is out of the

sphere to which the *Journal* is devoted, it will not be reviewed critically.

Approximately 50 pages are given to the history and bacteriology of the *Lactobacillus* genus. This is largely straight bacteriology, but clinicians and bacteriologists alike will find the discussions useful and interesting. The chapter which deals with the oral and dental types of *Lactobacilli* is especially so in view of the findings of Bunting and others.

For upward of 20 years studies on the intestinal flora have been going on at Yale. The present volume covers the studies of the past 4 years.

The printing and binding are excellent and the entire volume is of such interest that it will well repay the reader for the time spent on it.

MAZŮCK P. RAVENEL

The Malden Health Series (rev. ed.)
New York: Heath, 1935.

The Voyage of Growing Up—By Clair E. Turner, Dr.P.H., and Grace T. Hallock. 204 pp. Price, \$.60.

In Training for Health—By Clair E. Turner, Dr.P.H., and Jeanie M. Pinckney. 152 pp. Price, \$.60.

Community Health—By Clair E. Turner, Dr.P.H., and Georgie B. Collins. 250 pp. Price, \$.84.

Physiology and Health—By Clair E. Turner, Dr.P.H. 278 pp. Price, \$.96.

These books, so carefully written and edited, which since their first appearance in 1928–1929 have been popular as supplementary readers and textbooks, have come out in new dress in the revised editions. The make-up of the books is essentially the same except for several new and additional illustrations in each volume and the gay covers which will brighten up any long shelf of school books. A few chapter headings have been changed. For in-

stance, in *Community Health* the new title of Chapter I, "Planning Your Health Program," is much more pertinent to the young reader than the abstract title, "Health." The revision of Chapter I also brings this book up to date in child health education content and procedures. The volume, too, has been revised to relate closely with the social science studies that have been introduced into the curriculum.

In the volume, *The Voyage of Growing Up*, a chapter on safety has been included. The revised treatment of the chapters on teeth and digestion are more consistent with the educational trend of teaching children facts as realities and not dressing them up by analogies.

In revising *Physiology and Health* the editors have done a commendable bit of work in transferring the experiments and activities bearing on the subject from the end to the beginning of each chapter.

ANNA B. TOWSE

What About Alcohol?—By Emil Bogen, M.D., and Lehman W. S. Hisey. Preface by Haven Emerson, M.D. Los Angeles: Angelus Press, 1934. 105 pp. Price, \$1.50.

The introduction of this book states clearly the requisitions of such a work—the material must be truthful: scientific accuracy and reliability are important; the facts not only correct but simply and clearly told and in such a manner as to excite the interest of the reader.

The authors have given a useful book profusely and excellently illustrated, especially for the young. While they have adhered to facts they are often stated in an exaggerated form, and a number of impressions which can never be proved, and are actually not true, are given; for example, "But the person who drinks alcohol becomes as a result a worry to all of the people with whom he comes in contact"; ". . . as a person becomes more

and more used to alcohol he is apt to want it more and more . . ."; and other similar statements. One cannot but remember that in many countries, France, Italy, and Germany particularly, the use of wine and beer is habitual with the vast majority of the population, yet these countries produce much that is best in science, literature, and art. The English, who are competent handlers of stronger alcoholic beverages, control the largest empire in the world and conduct its affairs with signal ability and success.

Millions of people use alcohol in moderation throughout their lives without the dire results intimated or threatened, and some of the most famous physiologists have held that the paralysis of the higher functions pictured on page 56 is a distinct physiological rest which is beneficial to the subject.

In spite of these faults, the book is one of the best of its class. It ends with an extensive bibliography for those who wish to pursue the subject further.

MAZÛCK P. RAVENEL.

A College Textbook of Hygiene—
By Dean F. Smiley and Adrian G. Gould (rev. ed.). New York: Macmillan, 1934. 383 pp. Price, \$2.00.

This revision of a work which first appeared in 1928, consists largely in material changes of the first section, and the effort to modernize certain chapters.

In most chapters the revision is very slight, even as regards the bibliographies at the ends of chapters.

The content is divided into an introductory section touching upon heredity, bacteria and disease, and infection, one on prevention of disease, and sections on the various systems of the body, respiratory, digestive, nervous, endocrine, muscular, excretory, circulatory, genital, and special senses.

An attractive text—but rather elementary for college students. If interest is to be maintained, the student must have something into which to set his intellectual teeth.

CHARLES H. KEENE

New and Nonofficial Remedies, 1935
—Containing Descriptions of the Articles Which Stand Accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1935. Chicago: American Medical Association, 1935. Cloth. 510 pp. Price, \$1.50.

In this book the Council on Pharmacy and Chemistry lists and describes the medicinal preparations that it has found acceptable for general use by the medical profession. A glance at the list of the Council members and the long list of consultants appearing in the first part of the book gives ample warrant for the authority of the Council's selections.

A valuable feature of the book is the grouping of preparations in classes. Each of these is introduced by a general discussion of the group. Thus the silver preparations, the iodine preparations, the arsenic preparations, the animal organ preparations and the biologic products are each preceded by a general discussion of the particular group. These general articles compare the value of the products included in the group with similar pharmacopeial and other established drugs which it is proposed that these proprietary preparations shall supplement or supplant.

Physicians who wish to know why a given proprietary is not described in New and Nonofficial Remedies will find the "Bibliographical Index to Proprietary and Unofficial Articles not Included in N. N. R." of much value. In this section (in the back of the book) are given references to published articles dealing with preparations that have not been accepted. These include references

to the Reports of the Council, to Reports of the A. M. A. Chemical Laboratory and to articles that have appeared in *J.A.M.A.*

A. M. A. COUNCIL

Diet and Like It—By *Mabel E. Baldwin, Ph.D.* New York: *Appleton-Century*, 1935. 230 pp. Price, \$2.50.

This is a detailed exposition of meal planning for those who wish to lose weight, and for those who do not wish to gain weight.

Part I, pp. 7-112, is devoted to menus, which offer a wide selection of nutritious and protective foods. The caloric value of each standard portion is given, and the amounts to be consumed are stated as precisely as is practicable. There is no doubt that faithful adherence to the directions will be accompanied by reduction in body weight. It should be pointed out that there are schools of thought in dietetics, as in other branches of physiology. The menus that have been assembled are entirely orthodox but they are of the low protein-vegetable type. Those who belong to the high protein school will find it necessary to modify the diets somewhat.

Part II was prepared for those who find it necessary to guard against gaining weight, and for those who are looking for guidance in methods that are safe and effective. The chapter headings, somewhat condensed, are: Body Weight, Food and Body Weight, Protective Diets, Proteins, Fats, Carbohydrates, Minerals, Vitamins, Roughage, Planning a Protective Diet, Selection of Food, and an Appendix of Numerical Values of Food Factors. The treatment is non-technical, and for all practical purposes it is satisfactory.

This book is well adapted to the readers for which it was prepared, and dietitians will find it useful for reference.

A. G. HOGAN

Guiding Your Child through the Formative Years—By *Winifred de Kok, M.R.C.S., L.R.C.P.* New York: *Emerson Books Inc.*, 1935. 192 pp. Price, \$2.00.

An eminently readable and level-headed book is this small volume on the bringing-up of the young child. The author is a physician and herself the mother of two children whose development serves to illustrate the points she wishes to make. Nineteen chapters furnish an opportunity for wise advice on such varied topics as Weaning, Excretion, the Perfect Routine, Learning to Talk, Fears and Fancies, Sex Education, Infantile Habits, Freedom and many others.

Learned and technical discussions are, quite properly of course, conspicuously absent from this book which is evidently intended for the use of mothers; yet the background of thorough familiarity with all the modern scientific ideas concerning child care is evident in every chapter.

Some mothers may be a bit taken aback at the matter-of-fact way in which the subjects of sex and of elimination are treated but the simplicity and sincerity of it are obvious throughout; the child's point of view is fully grasped and that in itself makes for sincerity. MERRILL E. CHAMPION

Mental Hygiene for Effective Living—By *Edwin A. Kirkpatrick.* New York: *Appleton-Century*. 1934. 387 pp. Price, \$3.00.

Addressing himself to beginning students of Mental Hygiene, the author says in his Preface that he has gathered facts and truths from the fields of "anthropology, physiology, sociology, psychology, child study and education," that he has attempted to "temper them with common sense . . . to present the characteristics of normal functioning, and to show how variations from the normal are produced." The ma-

terial appears to have been selected on the basis of its popular appeal and practical application to the situations of everyday living, and is presented in a style both interesting and clear.

The author's approach to deviations in development and behavior through an understanding of the normal is, in itself, commendable. Throughout the book, however, there runs the tendency to overemphasize the ease with which the principles of mental hygiene may be applied to the solution of the student's own problems and to those of others whom he would help. The student, with little if any background, is advised to try out these principles on himself and his friends. This point of view runs counter to one of the most salient facts derived from the experience of the trained social worker, the psychologist, and the psychiatrist, namely, that the successful practice of mental hygiene is an art requiring a much more thorough background than can be gained from the reading of a single volume or the pursuit of a course of lectures.

In view of the author's purpose to familiarize the uninitiated with the meaning of mental hygiene it seems strange that he fails to mention the mental hygiene movement, as such, or the name of its founder, Clifford W. Beers, whose personal experiences and zeal on behalf of the mentally afflicted form the source from which have sprung the mental hygiene activities of the past 25 years. FREDERICK W. BROWN

Twelve Hours of Hygiene—By F. L. Meredith, M.D. Philadelphia: Blakiston, 1935. 364 pp. Price, \$1.90.

The design of this book, as stated in the Preface, is to fill a need for "one-hour-one-semester courses in hygiene for college freshmen."

We like the plan of the book very much. The chapters follow in logical sequence and cover pretty nearly every-

thing that need be given in an elementary course to freshmen. Indeed we suspect that for the average freshman some of the material is far beyond his comprehension, even though we acknowledge his need of it. For example, Chapter I contains 45 pages, under two heads, A and B—A, General Considerations, 19 pages, and B, The Ten Systems, 26 pages, either one of which is more than enough for a lesson for the average student. The same may be said for several other chapters, especially those which discuss difficult subjects such as Chapter XII, Reproduction and Sex.

There are 7 appendices, taken from well known authorities, giving the chemical composition of food materials, the phosphorus, calcium and iron content, 100-calorie portions, height-weight-age averages, etc., all of which are useful and well put.

The reviewer doubts the value of a book of this type for the purpose designated, and considers the title unfortunate. It is a good book for ready reference; the material is sound and well authenticated; and an abundance of common sense is in evidence. Each sub-title is put in the form of a question.

The book is well printed and bound, and we trust will accomplish its purpose. MAZÛCK P. RAVENEL

Laboratory Manual of the Department of Bacteriology and Immunology, Peiping Union Medical College—Prepared under the direction of C. E. Lim. 2nd ed. Peiping, China, 1935. 182 pp. Price, \$1.50.

This is an excellent book prepared for the guidance of students and staff members. There are some features which deserve special mention. Twenty-seven pages are given to the consideration of laboratory animals and their care. This contains a useful chart giving the normal differential blood

count of all animals and one bird most likely to be used in laboratory work.

There is also a section on the examination for pathogenic fungi.

The work is well documented, in addition to which 3 pages are given to a list of reading references. It is well printed and clearly written, but unfortunately there are some errors apparently due to the printer's unfamiliarity with English; for example, on page 49, we find "paper" instead of "appear"; on page 134, "peritoneum" instead of "peritoneal"; on page 150, "altual" instead of "actual."

The book contains a great amount of valuable material well condensed, and is up to date. The only omission detected concerns the H and O agglutination. This little work can be thoroughly commended. MAZÛCK P. RAVENEL

Dysentery in Denmark: A Contribution to the Bacteriology and Epidemiology of Infection with Sonne and Flexner Bacilli—By Knud Bojlen. Copenhagen: Bianco Lunos Bogtrykkeri A/S, 1934.

These investigations were carried out in the State Serum Institute at Copenhagen under the direction of Dr. Th. Madsen during the years 1926–1933, and are here reported in English.

After giving a comprehensive review of the literature on dysentery bacilli, the author presents the results of his own studies based upon 1,786 Sonne and 1,206 Flexner cultures obtained from more than 1,000 patients. While he found the Sonne bacilli to be serologically uniform, he was able to subdivide the newly isolated strains into 6 sub-groups on the basis of their

fermentation of certain sugars. In like manner, granting that the Flexner group contains several well defined serological types with mutually differing antigen-mosaic, he found that independently they may be divided into 10 sub-groups on the basis of their fermentation reactions. Although certain of these fermentation reactions may vary after sub-culture, he maintains that they are epidemiologically constant. Hence the biochemical subdivision is useful in tracing sources and contacts.

In the epidemiological section the author first gives a review of the literature on Institutional ("Asylum") Dysentery, and then reports his own observations. These include studies carried on continuously from June, 1927, to January, 1933, in Ebberodgaard Asylum for the feeble-minded, more limited studies in certain other Danish institutions, a number of house epidemics in various parts of the country, 2 milk-borne epidemics, and an intensive investigation of dysentery in a limited rural community carried on over a period of 3 years. He concludes this section with a general summary of the epidemiology of dysentery in Denmark, and a discussion of the factors involved in its maintenance and spread. On the basis of these studies, inferences are drawn with regard to the control of the disease.

This is a careful and thorough piece of work. It is undoubtedly one of the most important contributions to this subject made in recent years. It contains an excellent list of references bringing the bibliography up to date.

KENNETH F. MAXCY

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Of Human Liberty—Milk-borne epidemics totalling 40 with 1,324 cases and 44 deaths is the 1934 price we paid for the privilege of drinking raw milk. Typhoid fever ranked first in number of epidemics, but septic sore throat was far in the lead in numbers of cases affected.

CRUMBINE, S. J. Milk-Borne Epidemic Diseases in the United States and Canada. *Child H. Bull.* 11, 4:113 (July), 1935.

What's New About Flu—Interpandemic influenza, at least, is caused by a filtrable virus transmissible to mice and ferrets. The picture produced in the experimental animals may serve to distinguish the disease from related respiratory infections.

FRANCIS, T. Recent Advances in the Study of Influenza. *J.A.M.A.* 105, 4:251 (July 27), 1935.

Differentiating the Streptococci—Reasons for considering scarlet fever and erysipelas as distinct clinically and etiologically, each being caused by its own streptococcus, are convincingly set forth.

HEKTOEN, L. The Specificness of Certain Hemolytic Streptococci. *J.A.M.A.* 105, 1:1 (July 6), 1935.

Heat Sources and the Nose—After Leonard Hill stated originally that heat rays from dull surfaces tended to close the nostrils, whereas rays from luminous sources were "nose-openers," American and other researchers denied the claim and described the methods by which they came to the opposite conclusion. In this paper. Dr. Hill questions their researches and reasserts his original findings.

HILL, L. Nose-Opening Rays. *Am. J. Hyg.* 22, 1:183 (July), 1935.

More about Phage—Bacteriophage can be extracted from aqueous solutions by ether, and when partly removed, the residual phage may be restored in potency by transfer. In a second paper is described the preparation of a lytic filtrate (artificial bacteriophage) by incubating bacterial cultures, autoclaving, incubating again, and oxidizing with hydrogen peroxide.

LEMAR, J. D., and MYERS, J. T. Studies on the Nature of Bacteriophage. *J. Infect. Dis.* 57, 1:1 (July-Aug.), 1935.

Etiologic Factors in Heart Disease—In Chicago, 1,000 cases of heart disease were studied to determine the frequency of the various types. While most cases are readily classifiable, there are many difficulties, and the conclusion is stressed that each case is a highly individual problem with many issues to be considered.

MAHER, C. C., *et al.* Heart Disease in the Chicago Area. *J.A.M.A.* 105, 4:263 (July 27), 1935.

Blood Sugar and Nicotine—The "lift," so widely attributed to smoking in the latest cigarette advertising, is in reality a handicap which outraged Nature tries her best to counteract; this is the conclusion of an interesting study.

McCORMICK, W. J. The Rôle of Glycemic Response to Nicotine. *Am. J. Hyg.* 22, 1:214 (July), 1935.

Applying Mathematics to Health—This discussion of the necessity of applying statistical methods to clinical observation applies with equal force

to questions of public health administration. It is a paper which all would do well to take to heart.

MITCHELL, A. G. Critical Interpretation of Clinical Observations. J.A.M.A. 105, 4:241 (July 27), 1935.

Down to Brass Tacks in Tuberculosis—In this frank and wholesome discussion of the limitations of tuberculosis prevention, the term "relaxation" instead of the gruesome "collapse" therapy is proposed. Practical possibilities in providing opportunities for discharged cases is the main theme of the paper.

VARRIER-JONES, P. A General Survey of the Tuberculosis Problem. J. State Med. 43, 7:392 (July), 1935.

Depression Decline in Rhode Island Mortality—Contains a fairly complete set of tables. The greatest percentage declines were found at the younger ages, and in the infectious diseases, intoxications, nervous, and respiratory diseases. Increases were found for cancer, rheumatic and circulatory disease rates.

ROUND, LESTER A. Reprint from the Rhode Island Registration Report, 1935.

BOOKS RECEIVED

VITALITY. A BOOK ON HEALTH FOR WOMEN AND CHILDREN. By Elizabeth Sloan Chesser. New York: Oxford, 1935. 254 pp. Price, \$2.50.

HEALTH PROTECTION IN THE U.S.S.R. By N. A. Semashko. New York: Putnam, 1935. 176 pp. Price, \$1.75.

KNOW THYSELF. A STUDY IN MENTAL QUALITIES. By John Fox. Philadelphia: Dorrance, 1935. 267 pp. Price, \$3.00.

MENTAL HEALTH. ITS PRINCIPLES AND PRACTICE. By Frank E. Howard and Frederick L. Patry. New York: Harper, 1935. 551 pp. Price, \$3.50.

HOME RULE FOR METROPOLITAN CHICAGO. By Labert Lepawsky. Chicago: University of Chicago Press, 1935. 210 pp. Price, Cloth, \$2.00; Paper, \$.50.

THE HUMAN MACHINE. ITS USES AND ABUSES. By Lorena M. Breed. Boston: Stratford, 1934. 101 pp. Price, \$1.50.

THINKING ABOUT MARRIAGE. By Roy A. Burkhardt. New York: Association Press, 1934. 156 pp. Price, Paper, \$1.00; Cloth, \$1.75.

GYNECOLOGICAL AND OBSTETRICAL TUBERCULOSIS. By Edwin M. Jameson. Philadelphia: Lea & Febiger, 1935. 256 pp. Price, \$3.50.

LIVING ALONG WITH HEART DISEASE. By Louis Levin. New York: Macmillan, 1935. 126 pp. Price, \$1.50.

MEDICINE IN THE MIDDLE AGES. By David Riesman. New York: Hoeber, 1935. 402 pp. Price, \$5.00.

THE NEW HEALTHY LIVING. Two Book Series. By C.-E. A. Winslow and Mary L.

Hahn. New York: Merrill, 1935. Book I, 332 pp. Price, \$.84. Book II, 460 pp. Price, \$1.00.

FIFTY YEARS IN PUBLIC HEALTH. By Sir Arthur Newsholme. London: George Allen & Unwin, 1935. 415 pp. Price, \$5.00.

ESSENTIALS OF FIELD SANITATION. FOR THE MEDICAL DEPARTMENT, UNITED STATES ARMY. Revised edition. Prepared by Department of Preventive Medicine, Medical Field Service School, Carlisle Barracks, Carlisle, Pa. 1935. 180 pp. Price, \$.25.

LEWIS' NEW AIR CONDITIONING FOR COMFORT. By Samuel R. Lewis. 2d ed. Chicago: Keeney Publishing Co., 1935. 277 pp. Price, \$2.50.

PERSONAL AND COMMUNITY HEALTH. 4th ed. Clair Elsmere Turner. St. Louis: Mosby, 1935. 680 pp. Price, \$3.00.

LABORATORY MANUAL OF THE DEPARTMENT OF BACTERIOLOGY AND IMMUNOLOGY, PEIPING UNION MEDICAL COLLEGE. (2nd ed.) Prepared under the direction of C. E. Lim. 1935. Peiping, China. 182 pp. Price, \$1.50.

NEW AND NONOFFICIAL REMEDIES, 1935. Articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1935. Chicago: American Medical Association, 1935. 510 pp. Price, \$1.50.

DYSENTERY IN DENMARK: A Contribution to the Bacteriology and Epidemiology of Infection with Sonne and Flexner Bacilli. By Knud Bojlen. Copenhagen: Bianco Lunos Bogtrykkeri A/S, 1934.

ASSOCIATION NEWS

Sixty-Fourth Annual Meeting

Milwaukee, Wis.

October 7-10, 1935

ANNUAL MEETING INFORMATION

RAILROAD RATES FROM VARIOUS CENTERS TO MILWAUKEE, WIS.

From	Regular Rate	Special Round-Trip	Lower Berth	Upper Berth
	One-Way	Fare and one-third	One-Way	One-Way
Atlanta, Ga.	\$24.83	\$33.11	\$5.50*	\$4.40*
Baltimore, Md.	30.33	40.44	8.25*	6.60*
Boston, Mass.	39.18	52.24	10.13*	8.10*
Buffalo, N. Y.	21.36	28.48	5.63*	4.50*
Chicago, Ill.	2.55	3.40	Parlor Car Seat	.50
Cincinnati, Ohio	12.81	17.08	3.75*	3.00*
Cleveland, Ohio	14.81	19.75	3.75*	3.00*
Dallas, Tex.	30.40	40.54	7.00*	5.60*
Denver, Colo.	31.64	42.19	7.25*	5.80*
Detroit, Mich.	12.36	16.48	3.75*	3.00*
Duluth, Minn.	11.30	15.07	3.00	2.40
Fort Worth, Tex.	30.40	40.54	7.00*	5.60*
Indianapolis, Ind.	9.17	12.23	3.75*	3.00*
Jacksonville, Fla.	35.02	46.70	8.00*	6.40*
Kansas City, Kans.	15.55	20.74	3.00*	2.40*
Louisville, Ky.	13.35	17.80	3.75*	3.00*
Los Angeles, Calif.	68.26	91.02	15.75*	12.60*
Memphis, Tenn.	18.86	25.15	3.75*	3.00*
Minneapolis, Minn.	6.69	8.92	2.50	2.00
Nashville, Tenn.	16.15	21.54	3.00*	2.40*
New Orleans, La.	30.68	40.91	6.75*	5.40*
New York, N. Y.	35.25	47.00	9.00*	7.20*
Omaha, Nebr.	15.51	20.68	3.00*	2.40*
Philadelphia, Pa.	32.01	42.68	8.25*	6.60*
Pittsburgh, Pa.	19.43	25.91	4.50*	3.60*
Portland, Ore.	63.92	85.23	15.75	12.60
Salt Lake City, U.	45.36	60.48	10.25*	8.20*
San Francisco, Calif.	68.26	91.02	15.75*	12.60*
Seattle, Wash.	62.17	82.90	15.75	12.60
St. Louis, Mo.	11.22	14.96	2.50*	2.00*
Washington, D. C.	30.33	40.44	8.25*	6.60*
Montreal, Can.	31.76	42.35	9.00*	7.20*
Halifax, N. S.	53.11	70.82	14.95*	11.95*
Ottawa, Can.	28.76	38.35	8.25*	6.60*
Quebec, Can.	37.41	49.88	12.00*	9.60*
Toronto, Can.	20.26	27.02	5.63*	4.50*

* To Chicago only

A WORD TO THE THRIFTY

VERY few of us, at any time, will entirely disregard an opportunity to reap a financial benefit from thrifty buying or from careful and calculated investments. Why, then, do A.P.H.A. Fellows continue to overlook the gain inherent in Life Membership? They should do so no longer.

A careful study of the chart on the opposite page will reveal the savings which will accrue to Fellows by taking Life Membership at various ages. For example, a Fellow applying for Life Membership at the age of 40 will save a little over \$75. This saving (three-quarters of the cost of Life Membership) is of such proportion as to warrant careful investigation.

Beside the straight economical benefits, others accrue to Life Members: (1) annual payment of bills is onerous to some—Life Membership eliminates that; (2) in times of low income, a Life Member is assured of his continuation in the Association, thereby safeguard-

ing for all time his professional standing; (3) a Life Member can pride himself on the high type of professional spirit he has shown by investing in the future of public health work.

Life Membership dues need not be paid at once—the payments may be spread over a year from the date of election, which takes place at each Annual Meeting.

Some may ask—What is done with the dues of Life Members? They are set up in a Life Membership Fund entirely separate from other Association funds, and only the interest therefrom is used to carry the cost of each Life Member's participation in Association activities.

It must be obvious that the advantages of Life Membership far outweigh the disadvantages. The Committee on Fellowship and Membership, therefore, urges each and every Fellow to give serious thought to the desirability of applying for Life Membership.

APPLICANTS FOR FELLOWSHIP

IN accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Fellowship and Membership, and the Governing Council will take place between now and the Milwaukee Annual Meeting.

HEALTH OFFICERS SECTION

P. J. Crawford, M.D., C.P.H., Ancon, C. Z. Cornelius A. Harper, M.D., Madison, Wis. James A. Hayne, M.D., Columbia, S. C. Leopold M. Rohr, M.D., Jamaica, N. Y. John J. Sutter, M.D., Lima, O. William C. Williams, M.D., C.P.H., Nashville, Tenn.

LABORATORY SECTION

Clarence N. Boynton, M.A., Phoenix, Ariz. George J. Hucker, Ph.D., Geneva, N. Y. Benjamin S. Levine, Ph.D., Chicago, Ill. Kathryn R. Tirrell, B.A., Bridgeport, Conn.

VITAL STATISTICS SECTION

Marjorie Bellows, A.B., White Plains, N. Y. Thomas J. Duffield, B.S., New York, N. Y. Louis Weiner, E.E., New York, N. Y.

PUBLIC HEALTH ENGINEERING SECTION

Elmer W. Campbell, D.P.H., Hallowell, Me. M. Warren Cowles, B.S., Ridgewood, N. J. John R. Hoy, B. Chem., Jacksonville, Fla. Charles E. Trowbridge, B.S. in S.E., New York, N. Y. Arthur D. Weston, Newton, Mass.

INDUSTRIAL HYGIENE SECTION

Theode Saint-Martin, M.D., D.P.H., Noranda, Que.

CHILD HYGIENE SECTION

C. M. Derryberry, Ph.D., New York, N. Y.

PUBLIC HEALTH EDUCATION SECTION

Midian O. Bousfield, M.D., Chicago, Ill.
J. Clarence Funk, LL.B., Harrisburg, Pa.
Marie F. Kirwan, New York, N. Y.

PUBLIC HEALTH NURSING

Helen J. Bean, M.A., Washington, D. C.
Florence I. Buchanan, Jacksonville, Ill.
Eva D. Calhoun, Cincinnati, O.
Edith S. Countryman, R.N., Des Moines, Ia.
Joyce Ely, Jacksonville, Fla.

EPIDEMIOLOGY SECTION

Charles Armstrong, M.D., Sc.D., Washington, D. C.
Lloyd Arnold, M.D., Chicago, Ill.
W. Arkell Browne, M.D., C.P.H., Richmond, Va.
Henry P. Carr, M.D., Havana, Cuba

Adrian R. Foley, M.D., Dr.P.H., Quebec, Que.
Filip C. Forsbeck, M.S., M.D., E. Lansing, Mich.

Daniel G. Gill, M.B., D.P.H., Montgomery, Ala.

Jacques P. Gray, M.D., M.P.H., San Francisco, Calif.

Benjamin G. Horning, M.D., M.S., W. Hartford, Conn.

Carl F. Jordan, M.D., C.P.H., Des Moines, Ia.

Karl F. Meyer, Ph.D., San Francisco, Calif.

Howard C. Stewart, M.D., Dr.P.H., Franklin, Tenn.

Ralph E. Wheeler, M.D., Dr.P.H., New York, N. Y.

Dorothy G. Wiehl, M.A., New York, N. Y.

Harry S. Mustard, M.D., Baltimore, Md.

UNAFFILIATED

Michael J. Bent, M.D., Nashville, Tenn.

Carolyn S. Whiting, R.N., Phoenix, Ariz.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Emil G. Ericksen, M.D., 122½ N. Phillips Ave., Sioux Falls, S. D., Health Officer
Harry B. Franchere, M.D., Altamont, N. Y., Health Officer
Matthew H. Griswold, M.D., 75 New Britain Rd., Kensington, Conn., Health Officer of Berlin
John D. Hunter, M.D., Box 173, Crowley, La., Director, Acadia Parish Health Unit
H. J. Mann, M.D., Brockport, N. Y., Health Officer and Medical School Inspector
Edward A. McLaughlin, M.D., State Office Bldg., Providence, R. I., Director, State Department of Public Health
John C. Sleet, M.D., Health Department, Norfolk, Va., Acting Health Commissioner
Rolla B. Stafford, M.D., State Dept. of Health, Topeka, Kans., Director of Rural Health
Paul von Haeseler, M.D., Romulus, N. Y., Health Officer

Laboratory Section

Katharine E. Cox, 1812 McClung St., Charleston, W. Va., Director, State Hygienic Laboratory
Lloyd D. Felton, M.D., Harvard Medical School, Boston, Mass., Assistant Professor of Preventive Medicine and Hygiene
Gesina A. F. de Holl, M.A., 1701-16 Ave., Birmingham, Ala., Bacteriologist, Bureau of

Laboratories, Jefferson County Health Dept.

Allen A. C. Nickel, M.D., Bluffton, Ind.

Wilfred J. Noonan, M.D., 14600 E. Jefferson Ave., Detroit, Mich., Research Clinic—Detroit Board of Health; Medical Director, Sherman Laboratories

Emil Weiss, M.D., 1853 W. Polk St., Chicago, Ill., Instructor of Bacteriology and Public Health, University of Illinois, College of Medicine

Vital Statistics Section

Catherine Alexander, 951 S. E. 55 Ave., Portland, Ore., Chief Clerk, Bureau of Health

T. Frederick Brunton, 197 Clarendon St., Boston, Mass., Assistant Actuary, John Hancock Mutual Life Ins. Co.

Mary E. Dalton, B.A., State Dept. of Health, Albany, N. Y., Assistant Statistician, Division of Vital Statistics

Helen D. George, A.B., 721 Gorsuch Ave., Baltimore, Md., Assistant Statistician, Bureau of Vital Statistics, State Dept. of Health

Mary Gover, D.Sc., 311 E. 30 St., Baltimore, Md., Associate Statistician, U. S. Public Health Service

Theodore A. Hill, 1707 Fairmont Ave., La Canada, Calif., Registrar of Vital Statistics, Los Angeles County Dept. of Health

Liverus H. Howe, 197 Clarendon St., Boston, Mass., Second Vice-President and Actuary, John Hancock Mutual Life Ins. Co.

Albert G. Love, M.D., Dr.P.H., Custom House, Philadelphia, Pa., Officer, Medical Corps, U. S. Army

George F. Lull, M.D., Dr.P.H., U. S. Army, Washington, D. C., Charge of Vital Statistics, Sub-Division Office of Surgeon General

Helen H. Marshall, R.N., 219 Boehne Bldg., Evansville, Ind., Executive Secretary, Vanderburgh County Tuberculosis Assn.

Vasilios G. Valaoras, M.D., C.P.H., Johns Hopkins School of Hygiene, Baltimore, Md., Student, Bio-statistics Dept.

August J. Vatter, 197 Clarendon St., Boston, Mass., Assistant Actuary, John Hancock Mutual Life Ins. Co.

Public Health Engineering Section

John J. Calman, 176 W. Adams St., Chicago, Ill., President, National Assn. of Master Plumbers

Harry H. Hendon, 216 Court House, Birmingham, Ala., Sanitary Engineer, Jefferson County

Mark D. Hollis, C.E., State Health Dept., Bismarck, N. D., Director, Division of Sanitary Engineering

Thomas D. O'Connell, 154 Norman Ave., Brooklyn, N. Y., Sanitary Inspector, New York City Dept. of Health

Food and Nutrition Section

Abraham Lichterman, Phar.D., 17 Old Orchard Rd., New Rochelle, N. Y., Inspector of Foods and Drugs

Leland S. McClung, Ph.D., American Can Co., Maywood, Ill., Research Bacteriologist

Child Hygiene Section

Thomas H. Blake, State Health Dept., Charleston, W. Va., Director, Division of Child Hygiene

Elizabeth J. Sachs, 125 De Sota St., Pittsburgh, Pa., Supervisor, Communicable Disease Dept., Children's Hospital

Public Health Education Section

Charles C. P. Anning, D.P.H., P. O. Box 89, Public Health Dept., Pietermaritzburg, S. Africa, Medical Officer of Health

Fred D. Brown, M.D., 740 N. 5th St., Richmond, Va.

Emma V. Carlsson, Ph.D., Women's College of the University of North Carolina, Greensboro, N. C., Head of Hygiene Dept.

Angus Graham, M.D., London Life Ins. Co., London, Ont., Canada, Medical Director

Fleta H. Williams, M.D., 2730 Giddings St., Chicago, Ill., School Physician, Oak Park

Public Health Nursing Section

Mary P. Billmeyer, R.N., State Board of Health, Portland, Ore., Director, Division of Public Health Nursing and Child Hygiene

Dorothy L. Campbell, R.N., Plainwell, Mich., Family Health Counselor, Allegan County Health Unit

Rhoda P. Sheldon, R.N., 268 Guy Park Ave., Amsterdam, N. Y., Rural Public Health Nurse, Fulton-Montgomery Health Unit, State Dept. of Health

Unaffiliated

Guy G. Campbell, M.D., East Gary, Ind., School Physician

Percy E. Mauzey, LL.B., 2208 W. Washington St., Phoenix, Ariz., Acting Health Officer and City Dairy Inspector

WE APOLOGIZE

We apologize for the item carried in the August News from the Field erroneously listing the death of Dr. Ralph Hendricks, Health Officer of Spokane, Wash., who, we are happy to state, is much alive.

COMMITTEE ON RESEARCH AND STANDARDS MEETING

THE Executive Committee of the Committee on Research and Standards met in the New York office on July 19. The group reviewed the activities of the committee this year.

It was reported that the Laboratory Section Committee on Standard Methods for the Examination of Dairy and Food Products is engaged in preparing a new report on Shellfish Examination. The Committee on the Control of Communicable Diseases has completed the text for a new edition, which will be issued shortly. Revisions are planned for Milk Analysis and Water Analysis.

A new Sub-committee has been established on Standard Methods for the Examination of Dishwashing Devices. This group is planning to present a preliminary report of its findings at the Milwaukee Annual Meeting.

During the year the committee has studied the many standards promulgated by the Association in past years in an attempt to determine the need for new procedures. Preparation for revision of many of the old methods has been made during the past year, with the result that many adjustments are now in sight.

Through its various sub-committees and Section committees allocated to it, the Committee on Research and Standards has coöperated with other

agencies on research problems. It has assisted in the study and preparation of numerous reports. It has just appointed three members to serve on a joint committee with the American Society of Civil Engineers and the American Water Works Association to adopt standard definitions used in water works practice.

The committee will continue to act as a coördinating and stimulating agency. It believes that in this fashion it can best serve the members of the Association. It will welcome suggestions from the membership as to ways in which it can be of greater assistance to them in their problems.

The Committee on Research and Standards has been devoting all of its energies to the development of the underlying bases, both in method and in standards of quality, for administrative action in the public health field. Its concern is primarily with providing standardized tools to assist in administrative execution. The task is naturally not a spectacular one, but it does result in the provision of carefully developed yardsticks and technics of measurement, without which public health administration would not be able to function successfully.

A meeting of the Committee on Research and Standards will be held in Milwaukee during the Annual Meeting.

NEWS FROM THE FIELD

CONFERENCE OF STATE SUPERVISING NURSES

AROUND-TABLE conference of State Supervising Nurses will be held at the Hotel Schroeder in Milwaukee, Wis., Saturday, October 5, 1935. Among the topics selected by the State Supervising Nurses for discussion are:

Public Health Nursing as a Part of the Social Security Program

Minimum Qualifications for Public Health Nurses

Rural Field Experience Centers

Regional Staff Conferences

Lay Participation in the Health Program

Working Relationships with other Official and Non-official Agencies

Since much of the discussion will center around qualifications for public health nurses and public health nurse training facilities, the State Supervisors voted to invite the directors of the accredited public health nursing courses to attend the conference also.

Twenty of the 32 states which have supervising nurses will be represented at this conference and the majority of the directors of public health nursing courses will attend. All of the delegates plan to remain in Milwaukee for the Annual Meeting of the American Public Health Association the following week.

DR. HASSELTINE STRICKEN WITH PSITTACOSIS

H. E. HASSELTINE, M.D., F. A.P.H.A., Senior Surgeon of the U. S. Public Health Service, at the Marine Hospital in San Francisco, Calif., is seriously ill with pneumonia, contracted from psittacosis while experimenting with sera for its treatment.

This is the second time that he has been stricken with psittacosis, the first attack occurring in 1931 while he was making laboratory studies in San Francisco of the outbreak of the disease. . . .

Health Service officials said that, to the best of their knowledge, this was the first instance of a recurrence of the disease. . . .

Dr. Hasseltine, 26 years in the Public Health Service, has made studies of bubonic plague, parrot fever, and for 4 years worked in a leper colony at Hawaii.—*New York Times*, Aug. 3, 1935.

NEW BACTERIOLOGICAL SOCIETY FORMED IN ILLINOIS

THE Society of Illinois Bacteriologists was recently organized as a local branch of the Society of American Bacteriologists, at a meeting held in Chicago on May 8, 1935, at which the following officers were elected.

President: F. W. Tanner, Ph.D., Professor of Bacteriology, University of Illinois, Urbana, Ill.

Vice-President: Fred O. Tonney, M.D., Director of Research, Board of Health, Chicago, Ill.

Secretary-Treasurer: H. J. Shaughnessy, Ph.D., Chief, Division of Laboratories, State Department of Health, Springfield, Ill.

A governing council has been appointed by the president, to be presided over by the vice-president, which consists of representatives of the various interested groups; *i.e.*, the universities and colleges, the state and city health departments, the hospital laboratories, the commercial clinical laboratory, the packing industry, the

canners' industry, the milk industry, and any other groups which may be designated from time to time.

Active members must meet certain educational requirements and be actually engaged in the teaching or practical applications of bacteriology.

Associate members are those interested in bacteriology, but not necessarily professionally engaged in its study or application.

Two meetings a year are to be held.

The program committee, headed by Fred O. Tonney, M.D., has announced the following program for the first session on November 1, 1935.

Aims and Purposes, F. W. Tanner, Ph.D., *President*, Professor of Bacteriology, University of Illinois, Urbana, Ill.

Trends of Medical Bacteriology, A. A. Day, M.D., Professor of Bacteriology, Northwestern University, School of Medicine, Chicago, Ill.

High Points of Agricultural Bacteriology, Speaker to be selected.

What Bacteriology Means to Industry, W. Lee Lewis, Ph.D., Director, Institute of American Meat Packers, Chicago, Ill.

The outstanding character of the program for the first meeting augurs success for the new society.

ROTUNDA HOSPITAL INVITATION

ANDREW H. DAVIDSON, M.D., Master of the Rotunda Hospital, of Dublin, extends the facilities offered by the Rotunda Hospital for Post-graduate work to those members of the Association going abroad to study. The schedule giving the program of work at the Rotunda Hospital is available upon application to Dr. Davidson.

INTERNATIONAL UNION AGAINST TUBERCULOSIS

THE Executive Committee and the Council of the International Union Against Tuberculosis met in Paris, at the headquarters of the Union, July 10 and 11, under the chairmanship of Dr. Piestrzynski, Under Secretary of State

for Poland. Delegates from 20 countries attended. The administrative meeting of the Council was devoted to the preparation of the program of the Conference of Lisbon, scheduled for September 8-10, 1936.

NEW ENGLAND AND NEW YORK SEWAGE WORKS ASSOCIATIONS

A JOINT meeting of the New England and New York State Sewage Works Associations will be held at the Hotel Van Curler, Schenectady, N. Y., on October 4-5.

For the technical sessions an interesting and varied series of papers has been arranged. Displays of sewage works equipment will be presented by a large number of manufacturers.

Following the famous sunrise breakfast of the New York State Sewage Works Association with round table discussion, on October 5, this time for both associations, there is scheduled an inspection of the Schenectady and Canojoharie treatment plants. Another feature of the meeting is a tour of the General Electric House of Magic, for members and their guests, on October 4.

ELI LILLY AWARD

AT the summer meeting of the American Association for the Advancement of Science in Minneapolis, the Theobald Smith Award in Medical Sciences was established by Ely Lilly & Co., of Indianapolis. The new award will be \$1,000 and a bronze medal, which will be given yearly for "demonstrated research in the field of the medical sciences, taking into consideration independence of thought and originality."

Fellows of the American Association for the Advancement of Science are to submit to the permanent secretary's office in Washington, D. C., the name of a proposed recipient, with full information concerning his personality, training, and research work.

Any investigator who is less than 35 years old on January 1 of the year in which the award is to be made is eligible. Nominations must be received before May 1 each year.

The president of the association and 4 fellows will be the committee of award. The name of the winner will be announced at the summer meeting, and the presentation will be made at the winter meeting of the association.—*J.A.M.A.*, Aug. 10, 1935, p. 444.

COMMUNITY HEALTH CAMPAIGN

ANATION-WIDE publicity program is being planned by member agencies of the National Health Council, to bring about health consciousness in local communities, according to a letter sent by Dr. Louis I. Dublin, chairman of the publicity committee of the Council, to the state health officers in each of the states of the Union.

It is planned, reads the letter, that the climax of this publicity campaign will be a Colonial town meeting, held in each of about 400 cities in October or November. The slogan of the campaign is Health Today and Tomorrow. The coöperation of state and local health authorities and voluntary agencies will be a prime factor in achieving this end. This is strictly an educational campaign, not a drive for funds.

The active assistance of health officers and that of medical societies in these cities is urged, to organize in each community a local group which will conduct an inquiry into health conditions there, leading to thorough consideration of local health needs. The town meeting is to give opportunity for free discussion of problems brought to light by the local inquiries.

Most of the state health officers have promised to coöperate fully in carrying out this health-educational program of the National Health Council.

The member agencies of the National Health Council are American Heart Association, American Public Health Association, American Social Hygiene Association, American Society for the Hard of Hearing, American Society for the Control of Cancer, Conference of State and Provincial Health Authorities of North America, National Committee of Health Council Executives, National Committee for Mental Hygiene, National Organization for Public Health Nursing, National Society for the Prevention of Blindness, National Tuberculosis Association—all active members. Advisory members are American Red Cross, United States Children's Bureau, United States Public Health Service; associate members are American Nurses' Association and Foundation for Positive Health.

A manual with detailed suggestions for carrying on the health campaign, including the inquiry and holding a town meeting, is ready for distribution, and may be obtained by sending ten cents to the National Health Council, 50 West Fiftieth Street, New York City.

ILLINOIS FAIR HEALTH EXAMINATIONS

UNDER a coöperative plan of the Sangamon County medical and dental societies, local hospitals and the Illinois State Department of Health, it is planned that 1,000 children from 6 months to 2 years of age were to have complete physical examinations and mental tests at the Illinois State Fair in Springfield, Aug. 17-24.

Arrangements were made also to give chest examinations, including electrocardiograms, to from 2,000 to 3,000 adults.

NEW YORK PLANS HEALTH CENTERS

ANEW district health center to be built under a program planned by the Department of Health was begun with the laying of the cornerstone re-

cently, in the Mott Haven district of the Bronx, New York, N. Y.

The Public Works Administration provided funds for 7 of these centers, of which the Mott Haven unit will be the first.

STUDY OF MATERNAL CARE

THE Children's Bureau is now engaged in the preparation of a report on community provisions for maternal care in Hartford, Conn., where the first of what is expected to be a series of studies of this subject was recently completed. The purpose of this series of studies is to ascertain: (1) The type of maternal care received by an unselected series of mothers in different localities; and (2) the proportion of these mothers and infants having abnormal conditions or diseases.

The study was undertaken in Hartford at the invitation of the Hartford Medical Society, the Hartford Health Department, and the 4 Hartford hospitals. An advisory committee of 5 members, representing also the local hospitals, was appointed by the Medical Society.

All deliveries at 28 weeks or more gestation, occurring in Hartford to Hartford residents between May 1, 1933, and May 1, 1934, were studied, about 2,250 cases in all.

The deliveries occurring during 6 months, April, May, June, 1933, and January, February, March, 1934, were studied in detail. A special grouping of months was selected to determine whether the fact of making the study was in itself influencing the care given. Physicians who had attended the private patients were interviewed and prenatal and postnatal data secured, and permission to abstract the hospital chart obtained. Post-delivery visits were made to homes to interview mothers. At these interviews a history of the health of mother and child was

taken, but no examinations were made.

The records of the Visiting Nurses Association pertaining to these cases were also studied, and items of interest from past histories were checked to hospital and clinic records where possible.

For about half of the deliveries, the delivery and immediate postpartum period was studied by means of data obtained from hospital and clinic records in the cases of hospital deliveries, and in cases of home deliveries by means of interview with the physician or midwife. A. W. H.

MUSHROOM POISONING

. . . The most deadly species of mushroom, *Amanita phalloides*, which causes more than 90 per cent of the deaths from mushroom poisoning, thrives from early June until the first autumn frosts. The flavor of this mushroom is reported to be delicious; the young specimens are the most poisonous and are also most apt to be mistaken for the edible forms by the inexperienced mycologist. Other persons, even less prudent, may ingest toxic varieties after trying various "tests" on them. One of the common kitchen examinations consists in placing a piece of bright silver in the utensil while the plants are cooking. If the silver is not tarnished, the mushrooms are considered safe for consumption. The efficacy of this worthless test is believed in by an astounding number of people.

Some of the fatalities observed in this country due to mushroom poisoning are caused by another variety of mushroom, *Amanita muscaria*. This species also is common in all parts of the United States. The action of the toxins from this type of mushroom is, apparently, more rapid than is that of the poisons present in the various forms of *Amanita phalloides*. Thus there are in general two types of mushroom

poisoning that may be encountered: the so-called rapid type (*mycetismus nervosus*), due to *Amanita muscaria*, and the delayed type (*mycetismus choleraiformis*), caused by the various forms of *Amanita phalloides*.—Editorial, *J.A.M.A.*, July 6, 1935, p. 34.

CHOLERA BACTERIOPHAGE IN INDIA

THE following statements regarding the experience with the use of cholera bacteriophage in India are taken from the *Annual Report of the Director of the Eastern Bureau of the Health Organization of the League of Nations at Singapore, for 1934*:

Madras—The conclusions reached were that—

1. The prophylactic administration of bacteriophage did not reduce the attack rate.

2. The prophylactic administration did appear to lessen the mortality rate.

3. Bacteriophage was not more useful than prodiarrhea mixture in the treatment of cholera.

Assam—They conclude that "the results establish a sufficient probability in favor of a significant effect of the administration of bacteriophage to form a basis of practical policy in the treatment and prevention of cholera in villages."

Cachar—"As far as figures from reliable data can show, there is no doubt that bacteriophage is an efficacious treatment for cholera."

In Nowgong and Habiganj, cholera-dysentery bacteriophage for the treatment of all diarrheas, dysentery, and suspected cholera has been continued. In Nowgong there has been no epidemic outbreak for 4½ years, and in Habiganj for 3 successive cholera seasons.—*Pub. Health Rep.*, July 12, 1935, p. 912.

20,000 NEW YORK CHILDREN IMMUNIZED

TEN weeks campaign for immunization of children against diphtheria, conducted by the Department of Health in Brooklyn and Manhattan, resulted in the protection of

14,591 in Brooklyn and 7,346 in Manhattan.

The New York City board of education, medical societies, Catholic school boards, and social and civic organizations of the 2 boroughs coöperated, and school children acted as special health officers to round up children under 6 years of age and have their parents sign immunization requests.

MICHIGAN HAS NEW HEALTH UNIT

THE establishment of a new health unit in Calhoun County, Mich., with Dr. Matthew R. Kinde, of Hastings, as Director, has been announced. The unit, which is a project of the W. K. Kellogg Foundation, is financed in part by appropriations of \$6,000 and \$3,000, respectively, by the county and state. It will open officially September 1.

Dr. Kinde, member A.P.H.A., has resigned as Health Director of Barry County to take over the new office. He has been succeeded by Robert B. Harkness, M.D., member A.P.H.A., Acting Health Officer of Eaton County for the past 3 months.—*J.A.M.A.*, July 20, 1935, p. 206.

FILM ON PUBLIC HEALTH SUBJECT

THE first motion picture, with sound and music, ever made on a public health subject is the new film called "Contacts," produced by the Hennepin County Tuberculosis Association of Minneapolis, in coöperation with the University of Minnesota.

This film shows what happens in a typical American home when there is an unsuspected case of tuberculosis within the family circle. It emphasizes the fact that tuberculosis is not inherited, that it may hide behind a mask of good health, that early cases of tuberculosis can only be located through the use of the tuberculin test and the X-ray, that every case comes

from another, and that the disease is spread among "contacts." The modern weapons in tuberculosis control, such as the use of the tuberculin skin test and the X-ray, public health education, and sanatorium treatment are reviewed in what is stated to be a highly effective panorama at the close of the picture.

"Contacts," now available to other groups and organizations, is being distributed through the National Tuberculosis Association and the Hennepin County Tuberculosis Association. It is a two-reel film made up in both 16 mm. and 35 mm.

KANSAS RESEARCH DEPARTMENT ESTABLISHED

THE establishment of a department of medical research at Bell Memorial Hospital, Kansas City, Mo., as a part of the work of the University of Kansas School of Medicine, with Dr. Ralph H. Major, Professor of Medicine, as director, has been announced. Clarence J. Weber, Ph.D., Instructor in Medicine, has been named associate in medical research.

INTERNATIONAL MEDICAL WEEK

UNDER the patronage of the Federal Council of Switzerland, an International Medical Week will be held at Montreux, September 9-14. Dr. Henry E. Sigerist, of Baltimore, is included among the speakers listed on the program; his subject will be "The Present Unrest in the Medical World."

In addition to lectures there will be clinics presented by the faculty of the University of Lausanne.

PASTEUR MEDAL AWARDED DR. KUHN

PROF. RICHARD KUHN, Director of the Institute for Chemistry in Kaiser-Wilhelm Institute for Medical Research, Heidelberg, Germany, has been awarded the Pasteur Medal by the Société de chimie biologique.

PERSONALS

DR. ARTHUR E. LIEN, of Spokane, has been appointed County Health Officer of Spokane County, Wash.

JOHN L. JONES, M.D., member A.P.H.A., until recently Assistant State Health Commissioner and Epidemiologist of Tennessee, has been appointed State Health Commissioner of Utah, to succeed Dr. T. B. Beatty, F.A.P.H.A., who has retired after many years of service. Dr. Jones is a graduate of the Harvard School of Public Health and for several years was epidemiologist in the Kentucky State Department of Health.

SOL PINCUS, F.A.P.H.A., has been appointed an additional Deputy Commissioner in the Department of Health of the City of New York. He is to head up the work carried on by the Sanitary Bureau and the Bureau of Food and Drugs. This position was created by the budget last year. From 1916 to 1923 Mr. Pincus was attached to the U. S. Public Health Service, as sanitary bacteriologist, then as sanitary engineer in various capacities, including state and district health work in the fields of water supply, milk supply, and the control of communicable diseases. In 1929-1931 Mr. Pincus was in charge of the administrative work and public health studies of the Philadelphia Hospital and Health Survey directed by Dr. Haven Emerson. He has recently been engaged in the construction and operation of public swimming pools.

THOMAS PARRAN, JR., M.D., New York State Health Commissioner, F.A.P.H.A., sailed recently for Europe, for the purpose of studying the social diseases situation in the Scandinavian countries.

KATHARINE TUCKER, R.N., F.A.P.H.A., General Director and Secretary of

the National Organization for Public Health Nursing, has accepted the position of Director of the newly organized Department of Nursing Education of the University of Pennsylvania, Philadelphia, Pa., effective September 1, 1935. The Board of Directors of the N.O.P.H.N. has appointed Alma C. Haupt, R.N., F.A.P.H.A., Acting Director, until the Board meeting in October, at which time it is hoped that a permanent successor to Miss Tucker will be named.

FRANCIS GEORGE CURTIS, M.D., F. A.P.H.A., Chairman of the Newton (Mass.) Board of Health for 42 years and one of the best known public health authorities in New England, has retired from active service. In addition to being chairman of the body, Dr. Curtis has served for many years as health officer of the City of Newton. He was first appointed to the Board of Health in 1893, and has been continuously reappointed by succeeding mayors. During the more than four decades that Dr. Curtis has supervised public health activities in Newton, he has brought his department to a high state of efficiency. For more than half of his term of service the office carried no remuneration. Previous to his connection with the Health Department, Dr. Curtis was for a number of years superintendent of the Newton Hospital, also an unpaid post. Dr. Curtis has been an active member of state, national, and international health organizations and has attended most of their conventions. He has been a member of the A.P.H.A. since 1897, and is a Charter Fellow.

BRIG. GEN. MATTHEW A. DELANEY, Commandant of Medical Field Service School, U. S. Army, Carlisle Barracks, Pa., received the honorary degree of Doctor of Science at the

annual commencement of Dickinson College, Carlisle, Pa., on June 10. He is a member of the A.P.H.A.

DR. EDWARD J. FINN has been appointed to succeed Dr. Francis I. Nettleton as Health Officer of Shelton, Conn.

DR. JOHN D. MILBURN has been appointed to succeed the late Dr. Frederick T. Fitch, member A.P.H.A., as Health Officer of East Hampton, Conn.

DR. ALBERT B. MCCREARY, of the Health Department of Memphis, Tenn., has been appointed to take charge of a district health unit in Virginia, with headquarters at Eastville, Va.

DR. DONALD C. BALFOUR, Professor of Surgery, University of Minnesota Graduate School of Medicine, Rochester, Minn., has been appointed Associate Director of the Mayo Foundation, a newly created position.

LESLIE A. LAMBERT, M.D., member A.P.H.A., of Flint, Mich., has been named Health Officer of Flint, to succeed Dr. Kenneth B. Moore, who resigned to study at the University of Michigan.

CLYDE C. SLEMONS, M.D., F.A.P.H.A., of Lansing, Mich., has been reappointed Health Commissioner of Michigan.

ARTHUR E. MCCLUE, M.D., member A.P.H.A., of Charleston, W. Va., has been reappointed State Health Commissioner for a term of 4 years.

DR. THOMAS H. BLAKE, of Buffalo, has been appointed Director of the Division of Child Hygiene of the West Virginia State Department of Health.

ELROY F. MCINTYRE, M.D., member A.P.H.A., of Sante Fe, N. M., was elected President of the New Mexico Public Health Association recently.

DR. SANFORD VINCENT LARKEY, since 1930 librarian and assistant professor

- of medical history and bibliography at the University of California School of Medicine, San Francisco, has been appointed Librarian of the Welch Medical Library of Johns Hopkins University, succeeding the late Dr. Fielding H. Garrison.
- WILLIAM H. EATON, M.D., F.A.P.H.A., for many years Health Officer of Santa Barbara, Calif., has been succeeded by Dr. Clarence T. Roome.
- DR. EUGENE H. DICKENSHIED, of Allentown, Pa., has been appointed Medical Director of Lehigh County, to succeed J. Treichler Butz, M.D.
- LYMAN W. CHILDS, M.D., member A.P.H.A., has announced his retirement as Supervisor of Health Service in the Cleveland Schools. He was appointed to the Cleveland, O., school staff in 1910.
- DR. ESMOND R. LONG, Director of the Laboratory of the Henry Phipps Institute of the University of Pennsylvania, Philadelphia, Pa., member A.P.H.A., has been made Director of Phipps Institute. Dr. Charles J. Hatfield, former Director, will be Associate Director, and Chairman of the Board of Directors in charge of the Institute. Dr. Henry R. M. Landis will have the title of Associate Director in charge of the Clinical and Sociological Departments.
- EDWARD R. DAVIES, M.D., member A.P.H.A., of Kingwood, W. Va., has resigned as Health Officer of Preston County, to take a similar position in Baltimore. Dr. Charles Y. Moser, of Terra Alta, succeeds Dr. Davies.
- AMY LOUISE HUNTER, M.D., member A.P.H.A., of New Haven, Conn., has been appointed Supervisor of the Wisconsin State Bureau of Maternity and Child Welfare, to succeed Charlotte J. Calvert, M.D., member A.P.H.A., retired.
- DR. JOSEPHUS J. P. BOWDOIN, of Atlanta, Ga., has been given a life membership in the Seventh District of the Georgia Congress of Parents and Teachers "in appreciation of his service to the children of the state."
- THOMAS C. GRUBB, Ph.D., has been appointed a member of the Illinois State Department of Health, and will conduct research in the control and prevention of disease.
- OLLIE M. GOODLOE, M.D., member A.P.H.A., of Paducah, Ky., has been appointed Health Officer of Mason County, with headquarters at Maysville, Ky.
- DR. AUBREY Y. COVINGTON has been appointed Health Officer of Union County, with offices at Morganfield, Ky.
- DR. JOHN H. WEAVER has been appointed Health Officer of Hope, Ark.
- DR. ANDREW S. GREGG has been appointed Health Officer of Fayetteville, Ark.
- DR. BENJAMIN J. TEAFORD, of Jonesville, has been appointed Health Commissioner of Bartholomew County, Ind.
- DRS. WILLIAM ALLEN DECKERT, JOHN M. HAWS, and ISADORE A. SIEGEL have been appointed Health Officers in the division of maternity hygiene of the Baltimore Health Department, Baltimore, Md.
- DR. JAMES L. MCCARTNEY, Director of Mental Hygiene at the Battle Creek Sanitarium, Battle Creek, Mich., has resigned to become Chief Psychiatrist at the New York State Vocational Institution on the Hudson River at West Coxsackie, N. Y., a correctional institute operated by the New York State Department of Correction for boys between the ages of 10 and 16.
- DR. LINDA GAGE ROTH, Dean of Women at Battle Creek College, Battle Creek, Mich., was elected President of the Michigan Student Health Association recently.
- DR. SAYERS J. MILLER has been ap-

pointed Director of the Student Health Service at Purdue University, Lafayette, Ind.; he has been acting director since the death of Dr. Oliver P. Terry.

DR. FRANK W. PARKER, JR., of San Bernardino, Calif., has been appointed District Health Officer in charge of Grant, Luna, and Hidalgo Counties, with headquarters in Silver City, N. M.

DR. FRANK J. CONAHAN, of Bethlehem, Pa., has been appointed Medical Director of Northampton County, to succeed the late Dr. Edgar M. Green.

DR. KENNETH M. LYNCH, of Charleston, S. C., has been appointed to the South Carolina State Board of Health, to succeed Dr. Robert Wilson, resigned; and Dr. Walter R. Mead, of Florence, succeeds the late Dr. William Egleston, of Hartsville, S. C.

DR. FRANCIS P. WISNER, of Marysville, Calif., has been appointed Health Officer of Sutter County, to succeed Dr. Trusten P. Peery.

DR. EDWARD J. ENGBERG, of St. Paul, Minn., for many years Secretary of the Board of Medical Examiners, was appointed a member of the Minnesota State Board of Health, to succeed the late Dr. Helen H. Hielscher. Dr. Max W. Alberts, of St. Paul, succeeds Dr. Engberg on the Medical Board.

DR. JONES L. HURST, of Dorset, O., has been appointed Health Commissioner of Ashtabula County, O., to succeed the late Dr. Walter S. Weiss, of Jefferson.

DR. J. GLENN HEMINGTON, of Uniontown, Pa., has been appointed Health Director of Fayette County, Pa.

DR. JOHN W. L. COOPER has been appointed Health Officer of Chattanooga, to succeed Dr. Frederick C. McIsaac.

DR. SAMUEL P. HALL, JR., formerly of

Chickamauga, Ga., has been named Health Commissioner of Walker County, Ga., to succeed Dr. Rufus F. Payne, who resigned to accept a position with the CCC Camp at Fort Oglethorpe.

DR. HOWARD H. VOLAN, of Syracuse, N. Y., has been appointed Epidemiologist in the Syracuse Department of Health, to succeed Dr. Gregory D. Mahar, who was recently made Health Commissioner.

DR. WILLIAM A. CARRIGAN, of Society Hill, has been appointed Health Officer of Darlington County, S. C.

DR. SEDGWICK SIMONS, of Georgetown, has been appointed Health Officer of Beaufort County, S. C.

HUBERT S. JACKSON, D.D.S., of San Antonio, and Dr. William P. Harrison, of Teague, have been appointed to the Texas State Board of Health.

DR. THOMAS N. GOODSON, of San Antonio, has been appointed Health Officer of Bexar County, Tex., and Dr. Lawton C. Biggers, of Bonham, of Fannin County.

DR. HINTON D. JONEZ, of Tacoma, was recently appointed Health Officer of Pierce County, Wash., to succeed Dr. James H. Egan.

DR. ARTHUR M. SONNELAND, of Bellingham, has been appointed Health Officer of Whatcom County, Wash., succeeding Dr. Johan C. Wiik.

DEATHS

DR. RUFUS CHOATE, Washington, D. C., who began the practice of medicine as an army surgeon during the Indian campaigns and continued it for almost half a century, died July 26, at the age of 88.

DR. JAMES ARMITAGE EMERY, Acting Chief of the Biochemic Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C., died July 28, at the age of 68.

PROFESSOR JOHN WEINZIRL, of Seattle, Wash., died the latter part of June.

He was a Fellow of the A.P.H.A.

FREDERICK T. FITCH, M.D., formerly Health Officer of East Hampton, Conn., member A.P.H.A., died recently.

CHARLES A. BEVAN, M.D., formerly Health Officer of West Haven, Conn., died recently. He was a life member of the A.P.H.A.

CONFERENCES

Sept. 12-14, Mississippi Valley Conference on Tuberculosis, Madison, Wis.

Sept. 20-Oct. 2, 7th International Medical Post-Graduate Congress, to be held during the World Exhibition, under the auspices of the University of Brussels, Bruxelles-Spa, Belgium.

Sept. 30-Oct. 4, American Hospital Association, St. Louis, Mo.

Sept. 30-Oct. 4, 21st National Recreation Congress, sponsored by the National Recreation Association, Chicago, Ill.

Oct. 3-5, Association of Military Surgeons of the United States, New York, N. Y.

Oct. 4, 5, Joint Meeting of the New England and New York State Sewage Works Associations, Schenectady, N. Y.

Oct. 5, Round Table Conference of State Supervising Nurses, Milwaukee, Wis.

Oct. 5-7, Conference of State Sanitary Engineers, Milwaukee, Wis.

Oct. 7-10, Sixty-fourth Annual Meeting of the American Public Health Association, Milwaukee, Wis. Headquarters: Hotel Schroeder.

Oct. 7-10, Annual Meeting of the American Association of School Physicians, Milwaukee, Wis.

Oct. 7-10, Meeting of the American

Association of State Registration Executives, Milwaukee, Wis.

Oct. 7-10, Meeting of the International Society of Medical Health Officers, Milwaukee, Wis.

Oct. 7-10, State Laboratory Directors Conference, Milwaukee, Wis.

Oct. 7-10, Conference of Wisconsin Health Officers, Milwaukee, Wis.

Oct. 8-11, Meeting of the Association of Dairy, Food and Drug Officials, Milwaukee, Wis.

Oct. 10-11, Meeting of the International Association of Dairy and Milk Inspectors, Milwaukee, Wis.

Oct. 14-18, 24th Annual Safety Congress, National Safety Council, Inc., Louisville, Ky.

Oct. 28-31, 18th Annual Meeting, American Dietetic Association, Cleveland, O.

Nov. 1, First Session of the Society of Illinois Bacteriologists, Chicago, Ill.

Nov. 1, 2, School Health Conference, sponsored by the Department of School Health and Physical Education of the National Education Association, Philadelphia, Pa.

Nov. 15, 16, Sixty-first Annual Meeting, New Jersey Health and Sanitary Association, Hotel Berkeley-Carteret, Asbury Park, N. J.

Nov. 19, 20, Annual Meeting of the Southern Branch, American Public Health Association, St. Louis, Mo.

Dec. 30-Jan. 4, 1936, Winter Meeting of the American Association for the Advancement of Science and Associated Societies, St. Louis, Mo.

Apr. 22-25, 1936, National Tuberculosis Association, New Orleans, La.

May 11-15, 1936, American Medical Association Convention, Kansas City, Mo.

July 27-31, 1936, Second International Congress on Mental Hygiene, Paris.

Sept. 8-10, 1936, International Union Against Tuberculosis, Lisbon, Portugal.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

October, 1935

Number 10

Health Information on the Air*

ALAN BLANCHARD

Publicity Director, California Tuberculosis Association, San Francisco, Calif.

WITH millions of dollars invested; with millions pouring in, with world-wide broadcasts a frequent occurrence; with the growing threat of television; and with the complete capitulation of all the die-hards among advertisers, entertainers, and the public who held out against it; radio is having growing pains.

Ten thousand dollars an hour is what radio's sponsors pay out to entertain us during the 18 hours of the radio day. Sponsors last year paid over \$72,000,000 for broadcasting time.

Radio has expanded so explosively that its actions appear somewhat insane. No one knows just where it is going—how big it will grow. Young executives sit in handsome offices, and though somewhat bewildered by it all, they perhaps know best radio's possibilities.

There are many contradictions to be found on the cost sheets of radio. Actors are eager to work for \$10 or \$15 a performance. Script writers will do a 15 minute play (remember that a stage play runs about 1 hour and 15 minutes) or even a 30 minute play for

\$25; but Eddie Cantor, Al Jolson, and Ed Wynn reputedly cannot work for less than \$6,000 a performance.

One wide-spread program costs its sponsor but \$22.50 for talent—that is for the organist—but Amos and Andy each get about \$75,000 a year and, all in all, the sponsors spend about \$160,000 a year to tell us about these two negroes—and of course tooth paste and mouth wash.

Half hour program costs may run from 0 to over \$20,000, depending on the talent and the extent of the broadcasting chain.

Stations vary in impressiveness from enormous and magnificent New York studios of the large chains, to a back room off a small tradesman's shop. All of these stations have similar call letters, and on the air—what with the magic of high fidelity electrical transcriptions and modern receiving sets—it is sometimes difficult to distinguish between the big and the little stations by the quality of their programs. All these stations are trying to reach the public—you and me and the man on the street—and most of them are doing it very effectively. Newspapers claim that radio is taking away their circulation; and all of us know many people whose major contact with the world is

* Read at the Sixth Annual Meeting of the Western Branch, American Public Health Association in Helena, Mont., July 2, 1935, as part of the report of the Committee on Health Education Methods.

through the radio. It can be well imagined that there are a large number of people in this country whose only source of information, other than back fence gossip, is their radio receiving set.

It was this bewildering new medium for the spreading of information that your Committee on Health Education wished to examine with a view toward using it more effectively. Much has been said among educators in general about the need for governmental control of radio, in order that its social value might be enhanced by turning it over to educational work. Criticism has been directed against the monopolizing of radio by advertisers for big business. Health workers have claimed that the pseudo-health programs of advertisers fill the air and spread dangerous half-truths about hygiene and disease.

Every one of us, each with his own special message with which he would indoctrinate the masses, feels that at least a portion of the time on the air should be set aside for that purpose. We all forget that radio is in the unique position of being in the show business, while its revenues are derived from advertising. The public wants this new medium mainly for entertainment, and someone must pay the bill. The health worker may want to tell the world about the danger of communicable disease—in a dry-as-dust talk—but he, himself, listens only to "One Man's Family."

Your committee in approaching the problem of health education by radio wished to know the amount and nature of health information now being given on the air: the policies, and changing trends in policy, of the radio stations toward health broadcasts, both commercial and non-commercial or sustaining; in order that the committee might suggest a plan for health workers to follow for their greater and more effective use of radio.

Accordingly your committee conducted a survey of all radio stations in the San Francisco Bay Region, gathering information on the legislation related to radio and advertising, and other information touching on health broadcasting. The survey of the San Francisco Bay Region was chosen for its convenience, but it is believed that the findings apply with little variation to other regions in the West.

Two questionnaire forms were made up—the first listing all programs carried by a station, both commercial and non-commercial or sustaining, that touch in any way on health subjects. The second questionnaire listed questions on station policy in regard to health programs.

There are 12 commercial radio stations in the Bay Region. There are 2 National Broadcasting Company chain stations, 1 Columbia Broadcasting System chain station, 2 stations operating under the same management, one being in San Francisco, the other in San Jose, 2 newspaper stations, 1 being part of the Hearst chain, the other being run by the *Oakland Tribune*, 2 independent stations of important size, and 3 small independent stations.

The committee first tried to get from the National Association of Broadcasters in Washington, D. C., from the National Advisory Council on Radio in Education, and from other sources compilations showing the extent of health broadcasts in various regions of the country, but finding that such data have not been gathered, decided to get this information from the sample group of 12 stations mentioned.

The first questionnaire listed the following points related to the health broadcast programs:

1. The radio station
2. The name of the program
3. The name of the sponsor (or if the program is sustaining)
4. The days the program is broadcast

5. The time of day and the length of time the program is broadcast

6. The type of program (whether music and announcements, dramatic sketch and announcements, health talk, etc.)

7. The product or service advertised

8. The type of health information given

9. Comments on the quality of the health information given

This last point was the opinion of the committee and was filled out only for those programs with which the committee was familiar. The other information was supplied by the broadcasting station, and for each station covers the programs for 1 week.

The committee visited each station directly to obtain this information. With but one exception, the stations willingly supplied the information. In the case of the one station refusing (one of the independent stations of important size) an estimate of the programs was made from various newspaper listings, and the answers to the questionnaire on policy were deduced from the manager's statements.

One factor which, more than the station or the habit of the listeners, affects the distribution of the audience is the entertainment quality of the program. Advertising surveys have indicated that this factor is the most important of all; so in considering the programs that follow we can only hazard a guess—based on the hour of the day, the chain system, and other known factors—at the number of persons that the good and bad health programs are affecting.

The NBC stations are carrying 19 commercial programs that deal in some way with health subjects. Two of these are on the smaller station KGO, and the other 17 are carried on the larger station, KPO. All of these are entertainment programs—mostly variety shows, dramatic sketches, musical programs—though there is one cooking chat, and also one of comment on public affairs. None of these programs

may be classed as "Health Talks." The health qualities of the product or service advertised are told in the announcements, which are usually short. A sample is the Pepsodent program "Amos 'n' Andy."

A number of these programs are given but once a week; many are given in series of 3 to 5. The air time amounts to 10 hours and 45 minutes a week on KPO, and 2 hours a week on KGO. This is out of a total air time on each station of 126 hours a week.

The value of air time varies with the time of day. It is known that the audience is small in the morning, steps up to a higher level during the afternoon, and steps up rapidly again during the evening from 5:30 to 10:30 p.m. Sunday afternoon compares with the peak evening time during the week.

The committee made a detailed analysis of the time allotted by each station to the various classes of health program which has been omitted on account of space.

On all the 12 Bay Region stations, a total of 44 hours and 45 minutes of commercial programs that touch on health subjects are carried. Health education programs are carried only on the important stations, and total 1 hour and 58 minutes a week in time.

At present no dangerous commercial health programs are known, and the few poor ones on the important stations are expected to be removed shortly.

The amount of time given health education seems very small, but this time is on important stations and is at good periods in the day. Irregularly these stations give more time to this subject. It should be remembered that health is only one phase of the educational work these stations are doing.

In considering the question of station policy, it was decided that a questionnaire covering many definite points, such as "Does the station take laxative advertising?" would not prove

satisfactory, since one exception would make the answer give an untrue picture of the station's policy. Therefore, a set of very general questions was prepared, the answers to be filled in at an interview with the station manager. The questions are:

Has the station any policy on the amount of air time given:

1. To health subjects?
2. To general education?

If so, does the policy apply to commercial programs?

Has the station any policy on the nature of health subjects which may be discussed?

Has the station any policy on the high level of the products advertised on commercial health programs?

Is the opinion of medical or health authority sought?

Has the station any policy on the high level of information given on commercial health programs?

Has the station any sustaining health programs, or non-commercial health programs? What sort?

Would the station be willing to give time on the air to a representative public health group, such as city or county health department, or branch of the American Public Health Association?

Would a minimum fee be requested?

The information given allows us to group the stations in 4 classes. We believe similar classifications could be made in other regions. Our classes are:

The chain stations: NBC and CBS

The newspaper stations: KYA and KLX

The large independents: KJBS, KQW, KROW, KSFO

The small stations: KRE, KLS, KGGC

The chain stations have the most definite plan for educational broadcasting. Both chains contribute time and some funds to educational programs. NBC has an educational division in San Francisco, with a full-time director who is engaged in forwarding and coördinating this work. NBC, in its health education work, prefers to deal with various health groups through some official and unassailable

body, such as a university. It was pointed out that there is so much friction between different units in the health field—the physicians, health workers, chiropractors, religious cults, etc.—all of which the radio station must recognize and treat with equality, it is difficult for the station to work with any one group. However, were the Western Branch to represent a wide enough range of health activities, they would be more able to forward a program we might devise.

The newspaper stations are run with a policy similar to a newspaper, and would forward health programs having news interest. Their educational work, more sporadic than that of the chains, still is of definite value.

The independent stations have developed educational programs where there has been stimulation from educational groups. The scarcity of health education programs on these stations is a reflection on health workers.

The small stations are willing to coöperate with any community group, but prefer to hold to their general plan of records and spot announcements, rather than develop more elaborate programming.

In relation to commercial programs that touch on health, certain general checking on the product is done by all stations. The chains usually check with their national offices. The newspaper stations check with the advertising bureaus of the newspapers, and further check is made on the nature of the information to be given before the program is allowed on the station. The independents may be more or less careful, depending on the nature of the management. Where there has been coöperation with health and educational groups, there usually develops a higher consciousness of community obligation on the part of the management. The small stations get few advertising offers in this class, and usually

the small stations are connected with some church, or business organization—radio is a side line—and do little in the advertising field.

The general policy of all stations in relation to commercial health programs is founded on good taste, rather than on the careful picking of the product for its health values. CBS has recently issued an order that all programs for laxatives, deodorants, internal remedies, etc., carried on the chain be discontinued as soon as their contracts expire; and in the meantime is closely watching the advertising on such programs. NBC has long followed a similar policy, and most of the other stations are doing likewise. This policy was best expressed by the manager of one of the independent stations, who pointed out that the radio program goes into the "family circle," and is seldom heard by individuals alone. No objectionable subjects should be presented on the air. Although the stations are losing many immediately profitable contracts, they have found it better business to discontinue such programs.

Health workers may welcome this change that is bringing the removal from the air of all programs advertising internal remedies and like products, but they may not realize that this same trend means the removal of many of their own health programs on similar grounds. It is quite apparent—and many of the station managers pointed this out—that health programs dealing with pathologic conditions, discussing the details of disease, and of a morbid nature, are equally objectionable with such commercial health programs as mentioned. Your committee believes that certain channels should be used for disseminating various types of health information, and that radio is the channel for only a part of this information; and believes that health workers might best follow the example of advertisers when they prepare their

radio programs. Radio health programs should deal with beauty, happiness, and the positive values of health, rather than with disease and the morbid aspects.

Another factor, other than the improvement of taste, which is improving the quality of commercial health programs, is the extension of legislation against such programs. Your committee corresponded with the Federal Communications Commission (which was the Federal Radio Commission) in Washington, D. C., and visited the San Francisco branch offices of the Federal Communications Commission, the Federal Trade Commission, and the Food and Drugs Administration; and learned the nature of this present and proposed legislation.

It was found that health workers have the legal weapon to force off the air any "quack" health program that can be shown to be dangerous to the public health. The Federal Communications Act, designed primarily to exert control over the engineering factors in the field of communications, also gives the Commission power to rule off the air stations carrying programs that are objectionable from a general public interest or public service standpoint. The Commission has no power to censor such programs in advance, but on the receipt of a sufficient number of complaints, or the complaint of any responsible group or official, may investigate them; and if the complaints seem warranted, conduct a hearing. If, in the Commission's judgment, the program is against the public interest, it may revoke the license of the radio station carrying the program.

To date, 5 stations in the United States have had their licenses revoked by the Commission. Three of these were penalized because of "quack" medical programs. One was for the notorious Dr. J. R. Brinkley's Goat Gland Treatment program, carried on

a station in Kansas, and later moved across the Mexican border. The other 2 advertised cancer "cures"; Norman Baker's program being carried by an Iowa station, the other by a station in Oregon.

At present the licenses of 5 stations in Los Angeles are awaiting the judgment of the Commission on a hearing conducted in relation to programs advertising a "Neurometer," a mechanical instrument designed to diagnose human ills. Also 21 stations, many of them prominent, will have to prove to the Commission on October 3 "that their continued operation will be in the public interest." The action was taken because the stations had broadcast advertisements of a reducing preparation, which the Commission held was inimical to the public health.

Radio stations are active in bringing to the Commission's attention programs of this sort asking for the Commission's opinion on a proposed program, or complaining of programs carried by other stations. As has been said, the Commission has no power to censor programs in advance. Radio stations complain of this ruling, saying that no standard is set up whereby they may determine the acceptability of a program; they have to take their chances, and risk citations on the renewal of their licenses. However, the Commission's ruling is working to inhibit the stations from accepting commercial health programs of a dangerous nature.

It should be understood that the Commission has power only to rule against programs that are proved to be definitely dangerous to the public health. Before seeking action by the Commission, health workers should make sure that the program of which they complain falls within that definition. The Commission is located in Washington, D. C. Branch offices in the West are in San Francisco, Los

Angeles, Portland, Seattle, and Denver. Complaints against programs should be filed with the Commission through these offices. Electrical recordings and court reporter transcriptions of programs, properly certified, are used by the Commission when conducting hearings, and should be filed with complaints.

Another legal check on statements contained in radio advertising is found in the Federal Trade Commission Act. This Act, designed primarily to prevent unfair methods of competition in commerce, gives this Commission the power to proceed in respect thereof in the interests of the public. Deliberate misrepresentation and misleading advertising can be and has been stopped by this Commission. In a case under this law, the advertiser or manufacturer, not the radio station, would be held responsible for the statements made. As in the preceding case, complaint to the Commission will bring about an investigation. It should be understood that this law would only apply to exceptional cases in commercial health broadcasting. Any particular case should first be presented to one of the branch offices of the Commission in the West, located in San Francisco and Seattle.

The Food and Drugs Administration has control only over label and package advertising. The pending Copeland Bill will give the administration control over all advertising of foods and drugs, and will also bring under its control cosmetics and health appliances and curative devices of all descriptions. The features which caused such a storm of protest from radio, the press and manufacturers, have been amended. Group seizures of products have been ruled out except in the case of adulterated products. The clause holding the advertising medium, the radio or newspaper, responsible for the claims made, has been dropped, and the Bill pro-

poses to hold only the manufacturer and advertiser responsible. It is expected that the Bill as amended will pass Congress this session.

Your committee has attempted to find the best plan whereby we, as health workers, may work with the radio stations to use this medium for our purpose more effectively. We found that the radio workers know as little of the health field as health workers know of radio. They are confused by the many overlapping and paralleling organizations in the field of health. They are all anxious to aid the cause of health education, but may not show favoritism to any one group.

All the station managers stressed the need for organization of our educational activities, so that they might know a certain group was the accepted spokesman for the majority of the health agencies.

A survey of commercial radio advertising made by the Federal Communications Commission in 1932, indicates that educational institutions and groups do not make use of all the time that stations are willing to provide. At that time 95 per cent of all stations questioned said that this was true. Our survey indicates that this is still true. Every station but one was willing to give air time to a representative health group. The chain stations and others carrying sustaining health programs at present were willing to give more time to this subject, provided the subjects covered did not overlap their established programs. The other stations were quite willing to cooperate, provided the programs offered were of high interest value. The reason that so few stations have sustaining health education programs is that health workers have neglected to cultivate their assistance.

Your committee therefore believes:

That we must coordinate the educational work of all related health groups.

That we must study the material information offered by every health agency and group, and the publicity needs of each of these organizations.

That we must review this information with a view toward channeling through radio that which is suitable and proper to this medium.

That we must evaluate the proposed radio information and make proportionate allotments in our program planning for each field of health activity.

That we must devise a general program plan covering all radio stations and publicizing all fields of health activity.

That as a unified group, which is the accepted spokesman for all health agencies, we must present our plan to the many radio stations and work out with them a general and widespread program of health education on the air, that will have regularity and permanence.

Your committee therefore recommends that with your adoption of the proposed permanent Committee on Health Education: you make provision for a permanent Sub-committee on Radio; that divisions of this committee be located in San Francisco, Los Angeles, Seattle, Portland, and Denver, and in other important radio centers, with representatives in each community with a radio station; that provision be made for the allotment of funds for this work, to cover costs for typing and printing radio scripts, preparing electrical transcription programs, etc.; and that provision be made for this committee to make use of funds allotted to health education by various health agencies cooperating in this radio health education plan.

Your committee also points to the need for you, as individuals representing various health agencies, to work whole-heartedly with the proposed Committee on Radio in order that we may gain the benefits our unity of action will bring in this field.

Both the NBC and the CBS chain representatives we interviewed stressed the need for a national committee to bring about nation-wide radio health

programs on the chains. If we are to make use of these two most important units in radio, national planning should be considered.

Your committee therefore suggests that the Western Branch recommend to the parent organization, the establishment of a National Committee on Radio, with the purpose of actively engaging in broadcasting on a nationwide scale.

REFERENCES

1. Talmey, Allene. \$10,000 an Hour. *The Stage*, June, 1935.
2. Turner, C. E., Drenckhahn, Vivian V., and Bates, Maria W. Effectiveness of Radio in Health Education. *A.J.P.H.* 25, 5:589 (May), 1935.
3. *Broadcasting*, June 15, 1935; Editorial and news comment on the effect of Federal Communications Commission policies.
4. Committee on Engineering Developments. Present and Impending Applications to Education of Radio and Allied Arts. *Information Series*, No. 5, National Advisory Council on Radio in Education.
5. Tyler, Tracy Ferris. *Some Interpretations and Conclusions of the Land-Grant Radio Survey*, and

An Appraisal of Radio Broadcasting in the Land-Grant Colleges and State Universities, Publications of the National Committee on Education By Radio, 1933.

6. *Senate Report, Document No. 137, 1932. "Commercial Radio Advertising,"* being a report of the Federal Radio Commission on the use of radio facilities for commercial-advertising purposes, and for educational purposes.

7. *Rules and Regulations of the Federal Radio Commission.*

8. *Senate 3285.* Act creating a Federal Communications Commission.

9. *H. R. 15613.* Act creating a Federal Trade Commission.

10. *Rules, Policies, and Acts, of the Federal Trade Commission.*

11. Publications of the Food and Drugs Administration regarding the proposed Copeland (Tugwell) Bill.

ACKNOWLEDGMENT—Credit is due for aid and suggestions to the other members of the Committee on Health Education Methods; to: Louis Olsen, Chairman of Committee, Health Officer, Palo Alto, Calif.; Dr. Guy S. Millberry, Dean, University of California, College of Dentistry; Ida May Stevens, California State Department of Public Health; and Theodore Sierks, Los Angeles County Health Department.

The Vitamin Saga

Vitamin A keeps the cold germs away
And tends to make meek people nervy.
B's what you need when you're going to
seed
And C is specific in scurvy.

Vitamin D keeps the bones in your knee
Tough and hard for the service on Sunday.
While E makes hens scratch and increase
the hatch.
And brings in the profits on Monday.

Now Vitamin F never bothers the chef
'Cause this vitamin never existed.
G puts the fight in the old appetite
And you eat all the foods that are listed.

So now when you dine remember these lines
If long on this globe you would tarry.
Just try to be good and pick out more food
From the orchard, the garden, and dairy.

—R. Adams Dutcher, from *The Collecting Net*, Sept., 1935.

Basophilic Aggregation Test in the Lead Poisoning Epidemic of 1934-1935*

CAREY P. McCORD, M.D., F.A.P.H.A., F. R. HOLDEN, Ph.D.,
AND JAN JOHNSTON

Industrial Health Conservancy Laboratories, Cincinnati, Ohio

THE automobile production year 1934-1935 marks the outstanding epidemic of lead poisoning in this country for at least the past decade. This epidemic appeared in the automobile industry, which industry has been substantially free from lead poisoning since the abandonment of the dry-sanding of wooden bodies painted with lead-containing paints. This preceding epidemic was described by Dean in 1924.¹ The present epidemic has prevailed among the several thousand workers engaged in automobile body manufacture.

Recent trends in body design have led to one-piece, all-metal bodies with non-air-resisting contours. The manufacturing processes entailed call for the filling in of all welding depressions and other indentations with a lead-tin alloy. This leads to the use of molten lead pots and torch work, which in turn are followed by various processes for the smoothing down of the leaded surfaces, including power grinding, hand filing, sanding, etc. As a result the atmosphere of these workrooms is polluted by harmful quantities of lead dust and lead fume. Occasionally as much as 1,100 mg. of lead have been encountered in 10 cu. m. of air, which

amount of air approximates the quantity of air breathed by the average workman during the usual work day. However, the usual amount of lead in this quantity of air has ranged from 10 to 40 mg.

This type of lead exposure has brought about a high incidence of lead poisoning, together with the much larger groups of workers in whom proof of lead absorption has been established but who have not suffered subjective injury and have not lost time from employment. It is not possible to state the extent of lead poisoning during the past 12 months in the entire automobile industry. If the figures obtained from studies in a limited number of plants may be extended to the industry as a whole, it is possible that as many as 4,000 workmen have been injured to some extent during the 1934-1935 automobile production season. At best this figure is an approximation, and further it is emphasized that by no means does this number represent only actual clinical cases of lead poisoning.

During the past 10 years there have been many affirmations that industrial lead poisoning is a waning disease. While in some measure this has been true up until 1934, the outstanding fact is that it is the severity of the affection that is waning, rather than the frequency. Very strikingly this has been borne out by the present epidemic.

* To be read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

As far as is known among the large number of cases, there have been no proved deaths, little profound encephalitis, very few instances of wrist drop or foot drop, etc. With certainty it may be believed that there have been milder degrees of neuromuscular injuries, encephalitis, etc. The outstanding and almost uniform manifestations have centered about involvement of the gastrointestinal tract, accompanied by excessive fatigability and blood changes.

Already the work conditions that produced this recent epidemic of lead poisoning have been modified in many plants to the extent that large numbers of additional cases of lead poisoning are unlikely. In some plants elaborate protective devices and procedures have been introduced. As yet no practical substitute has been found for the lead-tin alloy, inasmuch as certain other alloys that otherwise might be used may not be used due to prohibitive costs, undue shrinkage, etc. All in all, it may be stated that at least in some automobile plants the lead hazards have been brought under control.

This recent epidemic has provided us a long sought opportunity for the extended investigation of a diagnostic procedure first utilized by us in 1924.² Already a publication³ has been made on this recent experience up to the time that 1,600 tests had been carried out. At this time the results of nearly 8,000 tests are available for the appraisal of the method. This test is based upon the enumeration of the total number of basophilic containing cells in the blood, in distinction to the widely used procedure of enumerating preformed stipple cells, the value of which method is now somewhat questioned. The method as carried out is similar to that lately used by Jones and his associates.⁴ Since the basophilic formations as seen in the microscope do not exist as such in the blood stream and are artifactually produced in the

process of preparation and staining, we prefer to use the term "Basophilic Aggregations," which term uniformly appears in the subsequent discussion of this test and our experience with it, which now follow.

BASIC PRINCIPLES

In normal adult human life, the content of erythrocytes in the blood stream is maintained on a fairly uniform level by the orderly entry of new cells from the bone marrow replacing those that have been destroyed.

These new cells are essentially mature, only about 1 per cent exhibiting any of the several known characteristics of immaturity. In bone marrow, during the formative period of erythrocytes, an entirely different cytology takes place varying with the stage of development of the red cells. Readily there may be demonstrated nuclei, protoplasm, and basophilic substance. In due time a change not known for any other cells of the body occurs; a chemical (hemoglobin) replaces the protoplasm and the nucleus is extruded. The erythrocyte is then ready for its chief function in the circulatory blood. These phenomena are set forth admirably in Key's⁵ fundamental paper on erythrocytic cytology. The mechanism which liberates cells when mature and conversely retains undeveloped cells is not known. However, the functioning of such a mechanism is well established.

Under conditions in which toxic agents exert an action on bone marrow, and under other conditions in which physiologic demands are made, increased numbers of erythrocytes enter the blood stream. As examples of the former may be cited lead, benzol, toluol, xylol, possibly arsenic and chlorinated hydrocarbons, such as carbon tetrachloride; of the latter the effects of high altitudes constitute an obvious instance. The chief charac-

teristic of these liberated immature cells is the presence of basophilic substance.

Polychromasia (polychromatophilia), punctate stippling, and reticulation are but different manifestations of one phenomenon—the presence of basophilic substance. The exact form of this basophilic substance existing in the unaltered blood is little known. Probably the picture observed as polychromasia after staining is nearest to the natural state of this material. The impression furnished by all available evidence is that of thousands of ultramicroscopic particles in acid suspension, or possibly in their innate form in acid solution. Reticulated cells probably are produced only as a result of laboratory manipulation and thus while not being true artifacts are laboratory creations. With suitable laboratory facilities one is able to observe through the microscope the actual formation of reticular processes in cells not previously exhibiting such reticulation. Through variations in laboratory technic, the experimenter may produce at will in a single blood smear all the well known varieties of reticulation, as fragmented, anastomosing, wreaths, mossy forms, etc. If the artificiality of reticulation be accepted as fact, then such terms as “reticulocytosis” conceivably may be regarded as anomalous, in so far as these terms betoken the existence of reticular forms in the circulating blood. However, stippled cells are believed to exist as such in the unaltered blood. Through unknown processes, the ultramicroscopic particles observed as polychromasia or the basophilic materials in acid solutions, are caused to arrange themselves into masses characteristic of stippling. From the literature these concepts are well borne out in substantial publications, brief excerpts from which are now recorded.

Key⁵ notes:

If an individual reticulated cell be watched carefully during the process of staining, the

net can be seen to grow under the eye of the observer as though it were being formed by precipitation of the substance from the surrounding medium.

It is difficult to conceive that fixatives cause a definite network to break up into ultramicroscopic particles and become uniformly distributed through the cell (*i.e.*, polychromatophilia). Fixatives tend to fix intracellular products *in situ*. It is consequently felt that the conclusion is warranted that the reticular network as seen in supravitally stained erythrocytes is formed only during the process of staining and that no such structure exists in the unaltered erythrocyte.

My observations lead to the belief that the granules of punctate basophilia are formed of the same basophilic substance which in simple anemias gives pictures of polychromatophilia and that because of the pathologic process the substance is aggregated into small granules in the cell [punctate stippling].

With Wright's stain allowed to dry on a slide to which salt solution and blood is added, no polychromatophilia is seen but a definite basophilic reticulation slowly appears in the basophilic erythrocytes.

Basophilic substance (*i.e.*, as a term) is preferable to “reticular substance” since reticulations are artifacts due to the action of a stain on a substance distributed uniformly through the cell.

In Hawes's⁶ work no distinction was made between polychromatophilia and stippling, but when total percentages of the two were added the results corresponded with fair constancy with the total percentage of reticulated cells enumerated by other means on the same blood. Such differences as were encountered were attributed to differences in the delicacy of the methods used and not to any true excess of reticulated cells.

Jones⁴ observes: “This (basophilic) substance is demonstrated either in the form of polychromatophilia, punctate basophilia, or reticular designs, depending upon the staining method used.”

Basophilic substance long has been regarded as the foremost blood finding in lead poisoning, but to an overwhelming extent reliance has been

placed upon the determination of stippled cells. Recognition that polychromatophilia, punctate stippling and reticulation are but different aspects of the same material, should prompt the placement of greater diagnostic dependence upon examinations for the totality of erythrocytes containing basophilic material. Of the three forms of basophilic substance, stippled cells are the least common. The positive diagnostic significance widely attached to the qualitative finding of stippled cells in suspected lead poisoning is becoming more and more questionable; conversely less uncertainty is believed to attend the quantitative determination of all basophilic erythrocytes.

TECHNICAL PROCEDURE

The blood of normal human adults rarely contains more than 1 per cent of basophilic erythrocytes. The average in our experience lies between 0.4 and 0.8 per cent. With workers absorbing lead without clinical manifestations and in early lead poisoning, the percentage commonly ranges from 1.5 to 4.0 per cent, with occasional findings up to 20.0 per cent. The zone between 1.0 and 1.5 per cent represents the threshold, findings within which being open to doubt. In the absence of other pathology, any finding in lead exposed workers of, or in excess of, 1.5 per cent at once suggests the probability of lead absorption. Findings in excess of 2.0 or 3.0 per cent are to be associated with an increased imminence of clinical lead poisoning.

Search for these basophilic forms is best made in laked cells. When laking takes place some of the basophilic substance probably leaves the cell with the hemoglobin. The remainder, being insoluble in water, salines, and some stains, collects in masses, strands, and reticula, as laboratory artifacts. Such forms are far more visible than poly-

chromatophilic cells and are more numerous than stippled cells.

In our first work ² a thick, even blood smear was entirely laked. The number of basophilic aggregations in an average of many uniform microscopic fields was interpreted in relation to our clinical observations of the persons examined either as controls or as leaded patients. This procedure justly has been criticized as not readily transferable to others for quantitative work, since the making of uniformly thick smears by divers persons is most unlikely. Under rigid research conditions this earlier method will yield quantitative results but now is not the preferred procedure. The technic now employed is here presented:

The Sussmann-Weindel stain advocated by Jones is quite satisfactory when its several ingredients are pure. The formula is as follows:

Toluidine blue	0.5 gm.
Borax	0.05 gm.
Methylene blue solution (Loeffler's)	5 c.c.
Distilled water	100 c.c.

Our experience with this stain has been that it is not uniform from one batch to the next. Most of the trouble may be traced to the toluidine blue. Of six samples of this dye recently purchased by us from various supply houses, only one was found to be satisfactory.

A modified Manson's methylene blue yields more consistent results. The formula is as follows:

Borax	1.0 gm.
Methylene blue	2.0 gm.
Distilled water (boiling)	100 c.c.

The borax is dissolved in the boiling distilled water and to this is added the methylene blue. After filtering, this stain is ready for use and provides a stable, satisfactory, and uniform stain for at least 2 weeks. If used for long periods, a progressive formation of

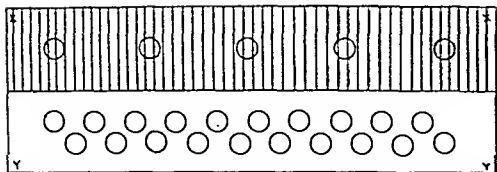


FIGURE I. Schematic arrangement indicating fixed (x, x) and unfixed (y, y) portions of slide, together with counting procedure on uniform slide.

precipitate may appear. However, due to the low cost and ease with which this stain is prepared, we consider this a small handicap. This stain is less stable than the Sussmann-Weindel, but in our experience gives more trustworthy results.

Thin, even blood smears are made on slides and allowed to dry. The proper drying of these smears becomes important. If permitted to become excessively dry, that is, longer than 12 hours, some of the basophilic containing cells will not lend themselves to aggregation of their basophilic material. On the other hand, insufficient drying facilitates removal of cells during the staining period. Ordinarily the optimum time lies between 1 and 3 hours. Under peculiar industrial conditions, involving high temperatures and low



FIGURE III. Typical microscopic field from fixed portion of same slide as in Figure II, presenting unlaked, stained red blood cells. Lines of Whipple grid used as guide in counting may be seen.

humidity, or conversely high humidity, special consideration for the drying period may be required.

After drying, one-half of the slide is overlaid by a strip of filter paper, as set forth by Jones, and cautiously there is applied with a pipette or dropper the minimum amount of methyl alcohol C. P. (methanol, wood alcohol) required to moisten the filter paper until it clings to the slide. This is allowed

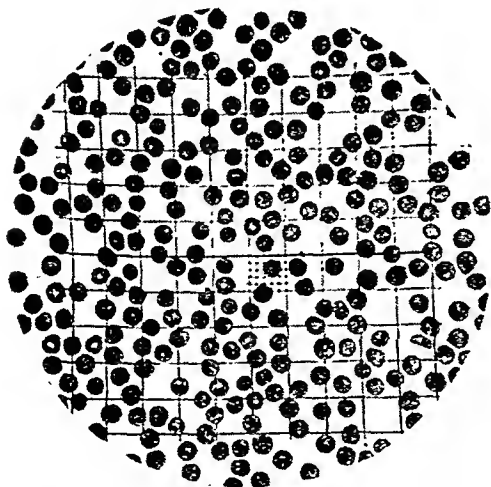


FIGURE II. Typical microscopic field from unfixed laked portion of slide presenting numerous basophilic aggregations.



FIGURE IV. Semi-schematic drawing of a basophilic aggregation in laked red blood cell. Manson stain. Magnification in original drawing: 17,000.

to dry until the filter paper becomes loose.

The slide is now submersed in a Coplin staining jar, containing the Manson stain, for approximately 10 minutes. The time is of minor importance since a readable stain may be had in 2 minutes, and on the other extreme it is impossible to overstain. After staining, it is necessary to wash the slides through 3 or 4 rinses of distilled water. In some cities tap water may be safely used for this purpose. Air drying of the slides is recommended.

The microscopic arrangements as used by us provide an oil immersion objective and a 10X ocular, which is fitted with a Whipple grid. The outer lines of this grid determine our microscopic field (Figure III). The average field in a good preparation contains approximately 150 red blood cells. Before counting, the slide should be examined for an area showing suitable distribution of the red cells. In the unfixed portion of the slide, customarily 10 consecutive fields in two parallel rows are counted, making a total of 20 fields, but in the more evenly distributed slide 20 consecutive fields. Then moving to the fixed portion of the slide, 5 appropriately corresponding fields are counted (Figure I). The basophilic aggregations are then expressed as a percentage of the latter.

Thus, if in the 20 fields counted in the unfixed portion of the slide there were found 76 B.A.s (Basophilic Aggregations), and if in the 5 fields of the fixed portion 1,000 red blood cells (or 4,000 in 20 fields), the obvious percentage is 1.9.

The physical features of the B.A.s are best presented in the accompanying photographs and photomicrographs (Figures II, IV). The color of the cells varies with the stain employed. A clear, brilliant blue is obtained with the Manson stain. A hand tally is used in the enumeration of the cells.

RECENT RESULTS

During 1934 and the first two-thirds of 1935, approximately 8,000 examinations were made, using the technic just described. The examinees represent employees in 16 plants and 6 different industries. Included in the 8,000 tests made are several hundred controls usually obtained from office groups. The lead exposed workers were distributed over the following industries: lead pigment manufacture, paint and other coatings manufacture, soldering, lead casting, lead oxide manufacture and application, and lead smelting. In some plants, but not all, concurrent determinations were made as to the amount of lead in the atmosphere expressed in terms of mgs. of lead per 10 cu. m. of air. In the aggregate, 416 quantitative lead determinations were made. The results from the basophilic aggregation tests have been correlated with the findings of the quantity of lead in the atmosphere breathed by exposed workers.

During 1934, basophilic aggregation tests were carried out simultaneously with stipple cell determinations, and in some instances with hemoglobin measurements and total red cell counts. Very early it was established that no consistent correlation was present. In many persons wholly unexposed to lead an occasional stipple cell was encountered and among lead workers approximately 90 per cent presented large numbers of stipple cells in the absence of clinical lead poisoning, and often after 3 months of no exposure to lead. The number of stipple cells in lead-using workers without clinical lead poisoning ordinarily was lower than 3,000 per million. The qualitative demonstration of stipple cells proved of no value in the diagnosis of clinical lead poisoning or in the making of decisions as to acceptability of men for continued work. Many workers regularly exhibiting stipple cells in

their blood smears passed through the entire automobile production season without illness and without any lost time. In similar fashion it was found that no significant diagnostic values resided in the routine determination of hemoglobin percentages or in total red cell counts. Over and over high percentages of basophilic aggregations were detected with no significant changes either in the hemoglobin or in the erythrocyte counts. For this reason all blood work other than the basophilic aggregation tests was abandoned as routine procedure in plant surveys, although complete blood work was carried out in the management of clinical cases of lead poisoning.

The trend of findings from 8,000 basophilic aggregation tests are now shown in three specimen tables.

Table I comprises the results from 25 representative controls. In establishing normal ranges of basophilic cells only such persons were utilized as

TABLE I

<i>Initials</i>	<i>Per Cent Basophilic Cells</i>
R. T.	0.4
E. T.	0.7
J. J.	0.4
L. H.	0.9
G. O.	0.5
S. M.	0.3
K. F.	0.6
R. H.	0.3
H. D.	0.9
M. G.	0.4
G. C.	0.5
O. L.	0.4
W. F.	0.2
J. B.	0.7
F. W.	0.4
H. K.	0.6
W. B.	0.2
J. R.	0.3
H. F.	0.7
W. K.	0.5
E. S.	0.3
C. W.	0.6
R. B.	0.3
L. K.	0.6
C. V.	0.4

TABLE II

<i>Initials</i>	<i>Age</i>	<i>Per Cent Basophilic Cells</i>	<i>Length of Time on Present Job</i>
C. S.	41	2.1	14 years
V. D.	37	1.2	8 years
J. M.	48	1.4	6 years
T. K.	34	3.5	9 years
J. K.	46	1.1	7 years
G. F.	41	3.2	1 year
A. S.	47	3.1	4 months
D. T.	55	2.3	6 years
G. B.	37	0.4	2 years
G. K.	30	1.5	10 months
T. M.	35	5.5	2 months
K. W.	29	1.6	5 years
E. C.	53	0.7	3 years
S. P.	30	2.0	5 years
V. T.	38	1.6	4 months
A. C.	36	3.3	1 month
F. N.	45	1.7	8 years
S. H.	28	1.4	3 years
J. G.	33	2.5	6 years
J. C.	32	0.5	2 years
C. C.	27	1.4	3 years
F. L.	40	2.4	4 years
J. S.	33	2.5	6 years
L. K.	47	1.9	4 years
C. R.	50	1.3	21 years

were known to be essentially unexposed to lead and definitely unexposed in industrial pursuits. Almost without exception control examinees present less than 1 per cent of basophilic containing cells.

In Table II may be found the results of 25 workers in an atmosphere containing lead to the extent of 14 mgs. per 10 cu. m. of air. In contrast to the control table just preceding, a fair number of these examinees present findings above 1.5 per cent. It is among workers having such findings as these that clinical cases of lead poisoning may be expected to arise. Almost uniformly it has been noted that the higher the lead content of the atmosphere the higher the percentage of exposed workers showing positive basophilic aggregation findings. On the other hand it has not been found that the percentage of basophilic cells increases with any uniformity in keeping with increases in the lead content of the atmosphere. An occasional worker may yield as high a figure as 10 or 15 per cent of B.A.s but this is not the rule and the majority of affected

workers regardless of the amount of the exposure will present positive findings in the range of from 2 to 6 per cent.

With the procurement of better work conditions, as reflected by lowered quantities of lead in the atmosphere, there occurs a corresponding diminution in the number of persons showing positive tests, although there is a lag of from 1 to 2 weeks before this drop may be demonstrated. This correlation between lead in the atmosphere and positive blood smears is reflected in Table III.

TABLE III

BASOPHILIC AGGREGATION TEST RESULTS ON WORKMEN BEFORE AND AFTER THE LEAD CONCENTRATION WAS REDUCED FROM 75 MG. PER 10 CU. M. OF AIR TO 4 MG. PER 10 CU. M. OF AIR. ELAPSED TIME: 35 DAYS.

Initials	Per Cent B. A. Cells When 10 cu. m. of Air Contained 75 mg. of Lead	Per Cent B. A. Cells When 10 cu. m. of Air Contained 4 mg. of Lead
M. V.	2.0	0.8
T. S.	2.1	0.7
A. L.	2.0	1.0
J. B.	3.2	4.6
W. H.	2.0	0.9
C. H.	3.4	1.4
J. T.	2.1	0.6
K. S.	2.7	2.0
C. S.	4.3	3.4
C. M.	2.6	1.6
V. K.	2.4	0.5
M. S.	3.0	0.9
C. G.	2.0	0.8
C. B.	2.0	1.0
J. E.	2.0	1.7
D. D.	2.5	2.2
D. T.	2.2	3.2
W. W.	1.1	4.0
J. K.	3.2	1.3
G. R.	3.0	0.8
G. C.	2.0	0.5
J. P.	2.1	1.6
A. R.	2.0	0.8
I. L.	3.1	2.4
P. P.	8.5	5.3

This specimen material is characteristic of the entire investigation, with one exception. In one plant, manufacturing a great variety of pigment materials, lead poisoning was known to be present but the basophilic aggregation tests were not found to be in keeping with our general experience. The assumption is that because of the

multiplicity of chemicals manipulated some biological antagonistic factor interfered with the usual reaction of the embryonic red cell to lead.

The chief application of this test has been in the routine examination of large groups of lead exposed workers. The results of such tests have been utilized as a guide for the transfer of workers to less hazardous departments, in the appraisal of the degree of exposure in different departments, in determining the effect of preventive measures, and in the differential diagnosis between lead poisoning and conditions simulating this disease, but in routine work its greatest single value has been associated with the detection of malingerers. During this epidemic in some plants, as high as 90 per cent of all exposed workers have simulated lead poisoning presumably in order to be eligible for insurance and sick benefits during the nonproductive season in the automobile industry. In some instances this basophilic aggregation test has been accepted as a sufficient criterion for the weeding out of these malingerers.

GENERAL COMMENT

In persons exposed to lead, otherwise free from disease, the detection of basophilic containing red cells in percentages in excess of 1.5, and particularly in excess of 2 per cent, suggests lead absorption and the possibility of approaching clinical lead poisoning.

Inconclusive proof is available that this test may be positive after exposure to other substances such as benzol, toluol, xylol, arsenic, etc. Occasionally in infectious diseases numbers of basophilic aggregations above the usual may be found. Manifestly in anemias and other types of diseases involving the red blood cells, normal ranges may be exceeded.

The length of exposure to lead ap-

pears to have no significant bearing upon the basophilic aggregation findings. Two weeks' exposure is ample to bring about increased numbers of basophilic containing red cells. New workers employed alongside of workers employed for a longer period are prone to show a greater frequency of response than the older workers.

In prolonged chronic lead poisoning the test described appears to be of limited value. The recession in the number of basophilic aggregations may be definite in long existing lead poisoning even in the presence of frank manifestations. Under such conditions punctate stippling may persist.

In many publications the minimum amount of lead that may lead to lead poisoning is specified as from 1 to 2 mg. as a daily intake. While this figure may represent a primary threshold at which an occasional case of lead poisoning may arise, it is our experience that many hundreds of workers continue at employment in concentrations much higher without demonstrable impairment. Without denying the possibility that a daily intake of 1.5 mg. of lead may produce lead poisoning, the belief is expressed that the practical threshold may be considerably higher and in the general range of from 4 to 8 mg. At least, years of exposure to such concentrations have not led to a single recognized case of plumbism in several plants included in this investigation.

One of the practical advantages served by this test as described lies in the fact that large numbers of persons may be examined daily. In our experience, a single worker has been able to collect as many as 300 specimens per day. Laking, staining, and cell counting, subsequently carried out, necessarily must be at a slower rate, but on a single day, as many as 70 counts have been made by one experienced technician. This rate of work

stands in contrast to stipple cell enumeration, which if properly carried out ordinarily yields not more than 20 determinations daily.

SUMMARY

In the 1934-1935 epidemic of lead poisoning in the automobile industry, 6,900 basophilic aggregation examinations of the blood were made. In addition during this period 1,100 tests were made in other industries, thereby totalling 8,000 tests during the investigation. This number includes approximately 500 control examinations made upon workers unexposed to lead.

Positive basophilic aggregation tests, the method for which is described in detail, have served as an index for lead absorption prior to the appearance of clinical manifestations of lead poisoning. This test has proved to be of value in the diagnosis of early cases of lead poisoning. An approach to this test was described by us in 1924. Through technical improvements, made by others and by us, this procedure is now suited to application by any physician or laboratory carrying out any blood examinations.

The basic principle in the basophilic aggregation test is the enumeration of red blood cells containing basophilic substance, in contrast to the customary procedure of qualitative or quantitative examination for stipple or polychromatophilic cells.

The native state of basophilic material in unaltered red blood cells is not known, but in the process of laking and staining red cells this substance may be artificially aggregated into readily visible masses. In normal human adults, these aggregates rarely exceed 1 per cent of the total number of erythrocytes, but in lead exposed individuals the percentages ordinarily lie above this normal maximum, when considerable lead is being absorbed or when clinical lead poisoning is im-

minent. Findings of percentages above 1 to 1.5 per cent and especially above 2 per cent in persons exposed to lead at once suggest lead absorption and the possibility of approaching lead poisoning, or the actuality of early lead poisoning.

In chronic lead poisoning this test usually is not, but may be, positive. As lead poisoning progresses to extended chronicity, the reliability of the procedure diminishes. This test has been utilized in lead-using industries to determine the number of exposed workers absorbing lead, as some proof of existing lead hazards, as a guide for the transfer of lead absorbing workers to lead-free departments, as a measure of the efficacy of preventive devices and practices, and as a means for the detection of malingerers.

There are varied types of diseases leading to positive basophilic aggrega-

tion tests, but in groups of workers in lead industries, presumably normal except for the possible effects of lead exposures, the positive basophilic aggregation test stands in some relation to lead absorption and its subsequent action.

REFERENCES

1. Dean, A. An Epidemic of Lead Poisoning Caused by the Sand-Papering of Automobile Bodies. *J. Indust. Hyg.*, VI, 6:245 (Oct.), 1924.
2. McCord, C. P., Minster, Dorothy K., and Rehm, Mathilde. The Basophilic Aggregation Test in Lead Poisoning. *J.A.M.A.*, 82:1759 (May 31), 1924.
3. McCord, C. P., Holden, F. R., and Johnston, Jan. The Basophilic Aggregation Test for Lead Absorption and Lead Poisoning, Ten Years After Its First Use. *Indust. Med.*, 4, 4:180 (Apr.), 1935.
4. Jones, R. R. The Estimation of Basophilic Cells (Reticulocytes) by Examination of Ordinary Blood Film. *Pub. Health Rep.*, 48:1011 (Aug. 18), 1933.
5. Key, J. A. Studies on Erythrocytes, with Special Reference to Reticulum, Polychromatophilia and Mitochondria. *Arch. Intern. Med.*, 28:511 (Nov.), 1921.
6. Hawes, J. B. A Study of the Reticulated Red Blood Corpuscle by Means of Vital Staining Methods: Its Relation to Polychromatophilia and Stippling. *Boston M. & S. J.*, 161:493 (Sept. 30), 1909.

Anthrax from Infected Shaving Brushes

THREE years ago a consignment of 12 shaving brushes came into Lambeth (a district of South London) and found to be infected with anthrax. The health officer seized 11, but the 12th had been sold and could not be traced. Every one of the 11 was found to be infected with anthrax. The brushes had apparently come from Germany and were sold wholesale at the rate of 6 for 30 cents. The ministry of health issued a warning concerning the brushes to the hospitals and newspapers in the neighborhood. At last the brush has been found, but unfortunately as the

result of a fatality. At an inquest on a boot repairer, who died in the neighboring district of Brixton, the pathologist stated that death was due to anthrax and that the brush was freely infected with the bacilli and spores of anthrax. The health officer gave evidence that a man might use an infected shaving brush every day for 2 years with impunity until he cut himself and became infected. The coroner remarked that the only satisfactory feature about the case was the vigilance exerted by the health authorities.—London Letter, *J.A.M.A.*, Aug. 10, 1935.

Relationship Between Electrophoretic Migration Velocities, the Virulence and the Types of the Diphtheria and Diphtheria-like Bacilli

K. PIERRE DOZOIS AND K. F. RAUSS

Department of Bacteriology, University of Maryland School of Medicine, Baltimore, Md.; and State Hygienic Institute, Budapest, Hungary

THESE studies were made to ascertain whether the electrophoretic migration velocity measurements made on microorganisms grown on Löffler's medium for 24 hours might be of value in routine work for determining the virulence of the diphtheria and diphtheria-like bacilli.

METHOD

The diphtheria strains used were obtained from the collection of the Bureau of Bacteriology of the Maryland State Department of Health through the courtesy of C. A. Perry. The virulence determinations and the typing were made by C. A. Perry (work not published). For the virulence determinations the intracutaneous guinea pig method was employed, while types were determined by colony morphology and carbohydrate reactions. The electrophoretic migration velocity measurements were completed before information as to virulence and type was obtained.

The bacteria were grown for 20 to 24 hours on Löffler's medium, pH 7 to 7.4. The surface growth was removed by washing with distilled water, pH 7. The bacterial cells of this suspension were washed three times. After the last

washing the suspension was homogenized by shaking for 2 minutes with glass beads and filtered through a thin layer of cotton. The electrophoretic measurements were made within 24 hours after the suspension was prepared. Dozois and coworkers (1935) have shown that the bacterial suspensions may be kept as long as 48 hours at 5° C. without a measurable alteration of the zeta potential.

Measurements of the electrophoretic migration velocity—The Kunitz modification of the Northrop-Kunitz Microcataphoresis Cell (1928) was used with a Bausch and Lomb 8 mm., 0.50 n.a. 21X objective, a 10X eye-piece and a micro lamp. After the cataphoresis cell had been filled with the suspension the current was applied for 6 minutes before readings were made. This is sufficient time for the microorganisms to reach a maximum velocity. Twenty readings were made at the two stationary levels, *i.e.*, 0.21 and 0.79 of the inside depth of the cell. An applied potential of 118 volts was used; this voltage gave a potential drop through the cell of 2.5 volts. The results are expressed in terms of 0.05 mm. per time (in seconds) with 118 D.C. volts.

It was not found necessary to con-

vert these results into velocities in microns per second, for the velocities are not constant and depend on various factors of technic. The velocities per unit of time do not represent a basis for comparing these results with those of other workers. Comparisons of the electrophoretic measurements were made with the results of the virulence tests. The results of our observations are comprised in Table I.

DISCUSSION

As shown in Table I, from the standpoint of velocity, 3 zones may be differentiated. The smallest zone (the diphtheroid zone) ranging from 6.51 to 7 seconds includes the more rapidly traveling diphtheroids; the largest zone (the virulent zone), from 7.01 to 9 seconds, comprised the greater part of the virulent diphtheria strains with the medium velocity. The 3rd zone (the avirulent zone) which comprises most of the avirulent strains with the slowest velocity, ranges from 9.01 to

10.50 seconds. The lines between the zones cannot be sharply drawn.

The virulent and avirulent zones are divided into velocity classes. In class 1 are those microorganisms with a velocity between 7.01 and 7.50 seconds, in class 2, those with a velocity between 7.51 and 8.00 seconds, and so on through the 7 classes. The borderline between the virulent and avirulent zone falls between classes 4 and 5. Strains in the velocity classes near the border of the zones often cross that line. Two virulent strains are in class 5, and 3 avirulent strains are in class 4. On the other extreme toward the diphtheroid zone the same phenomenon may be seen. Five diphtheroid strains are found in class 1. The virulent diphtheria strains do not appear in the zone of the diphtheroids.

The 2 virulent strains which appear in the avirulent zone, 3 avirulent strains in the virulent zone, and the 5 diphtheroid strains in the virulent zone would have led to incorrect observa-

TABLE I
TABULATION OF THE ELECTROPHORETIC VELOCITIES OF STRAINS STUDIED

		Diphtheroid Zone	Virulent Zone				Avirulent Zone			
		Seconds per 0.05 mm.								
		6:51-7:00	7:01-7:50 Class 1	7:51-8:00 Class 2	8:01-8:50 Class 3	8:51-9:00 Class 4	9:01-9:50 Class 5	9:51-10:00 Class 6	10:01-10:50 Class 7	Total
Diphtheria	Gravis	0	5	2	3	3 (Avirul)	1 (Virul)	0	1	15
	Intermediate	0	5	0	5	8 (Avirul)	2	1	0	15
	Mitis	0	2	4	10	2 (Avirul)	1 (Virul)	1	4	24
	Total	0	12	6	18	13	4	2	5	60
Diphtheroids	Hofmanni	2	3							
	Xerosis	3	2							
	Total	5	5							10
Grand Total		5	17	6	18	13	4	2	5	70

tions as to virulence had not the fermentation and intracutaneous tests been made. These above strains represent an error of 14 per cent, which is, doubtlessly, a greater error than that found by the intracutaneous test. This error is $3\frac{1}{2}$ times greater than that published by Jensen, Falk, Tonney, and White (1928), and approaches the results of Stone and Weigel (1929). The latter have found that there is not a sharp line between the virulent and avirulent strains and that there is also an interchange between them. Randall and Thompson (1931) have arrived at the conclusion that because there is no sharply marked line of distinction between the velocities of the virulent and avirulent strains electrophoretic methods of virulence determinations cannot be used in their present forms as a routine method.

A total of 70 strains were studied which represent all of the known diphtheria bacilli as well as the most common diphtheroids. As shown in the table, about half of the virulent strains appear in the velocity class near the border line which separates the virulent and avirulent organisms. The velocity distribution is sufficiently reliable to assume that at least 50 per cent of the strains of every series would belong to the borderline classes. Although the error found is but 14 per cent, in light of our experience, it may be as great as 50 per cent in other series.

There is another indication that the electrophoretic velocity method is not sufficiently advanced for routine work. Although Falk and his coworkers, and Randall and Thompson report that the avirulent strains migrate more rapidly than do the virulent, our findings are in accord with those of Stone and Weigel that the virulent strains migrate more rapidly than do the avirulent. These differences indicate that the potential difference of the bacteria depends on many and only partly known

factors. Falk, etc., and Randall, etc., used 48 hour old broth cultures for their determinations. Stone and Weigel have unfortunately not stated the medium they used. It is possible that the results we obtained were due to the fact that we used a solid medium (Löffler's medium) on which to grow the bacteria. It may be supposed that the electrophoretic velocity is not a constant feature of the bacteria, but depends upon factors of technic and environment. Although working under the same apparent conditions, a slight unavoidable change in technic might cause an alteration in the measured electrophoretic velocity.

As shown in the table, within each zone there is a certain tendency of the velocities toward the extremes. The gravis type apparently tends toward the extreme of the virulent zone, and the intermediate and the mitis types toward the avirulent zone. This trend suggests that the electrophoretic velocity of the diphtheria strains should be in accord with their virulence and the shift toward one or the other extreme should indicate the degree of their virulence. On the basis of this an attempt was made to determine, by means of the measured electrophoretic velocity, the variation of the virulence inside the three types (gravis, mitis, and intermediate) described by Anderson, Happold, and McLeod (1931). The errors in the electrophoretic velocity method were detected by studies of the intracutaneous tests.

In order to determine the variation of the virulence and the differences within each type, as well as the standard deviations and their differences, the mathematical mean of the electrophoretic migration velocity was calculated. The following are the results of these calculations:

1. Mean velocity of the gravis type (and its probable error) 7.94 ± 0.124 seconds
2. Mean velocity of the intermediate type

(and its probable error) 8.16 ± 0.151 seconds

3. Mean velocity of the mitis type (and its probable error) 8.11 ± 0.107 seconds

These figures indicate that the mean velocity of the gravis type is shifted toward the virulent zone; that of the intermediate type toward the avirulent zone, and that of the mitis type lies between the two. In other words, the gravis type would contain more strains with a higher degree of virulence than does the intermediate or the mitis type. These differences are, however, only apparent. "The significance test" shows the difference between the means was not significant (the difference between the gravis and intermediate 0.92σ , between the gravis and mitis 0.65σ , and between the intermediate and mitis 0.22σ). The even scatter of the strains as to their virulence distribution (migration velocity) was also ascertained by calculating the standard deviations of the type (standard deviation in order above; 1.33, 1.25, 1.35; differences 0.53σ , 0.18σ , 0.78σ). These calculations permit us to assume that if the velocity represents a degree of the virulence, the diphtheria strains studied show a corresponding virulence regardless of the type. Because our sample is small in regard to type distribution it does not permit us to draw final conclusions.

The distribution of the avirulent strains into types by means of colony characteristics and carbohydrate reactions offer figures of interest: 25 per cent of the avirulent strains belong to the mitis type, 19.05 per cent to the intermediate, and 13.33 per cent to the

gravis type. These figures offer further evidence for assuming the possibility of the variation of the virulence inside the diphtheria types.

SUMMARY

1. Electrophoretic measurements were made on 60 diphtheria and 10 diphtheroid strains, grown on Löffler's medium.

2. The diphtheroid strains showed the greatest velocity, the avirulent strains the least and the virulent strains represented a medium velocity between the two.

3. The borderline between the zones (diphtheroid, avirulent and virulent diphtheria) may not be sharply drawn because of the interchange of the strains located in the velocity classes in the vicinity of the borders.

4. Our determinations showed a 14 per cent error as compared to the virulence test carried out on guinea pigs.

5. Because of the errors, the electrophoretic method in its present form, cannot be used in routine work.

6. The variation of the virulence within the 3 diphtheria types was not demonstrable.

REFERENCES

- Anderson, Happold, and McLeod. *J. Path. & Bact.* 34:667, 1931.
 Falk, Jacobson, and Jensen. *A.J.P.H.* 16, 11:1102 (Nov.), 1926.
 Falk, Jensen, and Mills. *J. Bact.* 15:421, 1928.
 Falk, Tonney, White, and Jensen. *A.J.P.H.* 17, 7:714 (July), 1927.
 Jensen, Falk. *J. Bact.* 15:367, 1928.
 Jensen, Falk, Tonney, and White. *J. Bact.* 15: 413, 1928.
 Randall and Thompson. *Am. J. Hyg.* 14:235, 1929.
 Stone and Weigel. *A.J.P.H.* 19, 10:1133 (Oct.), 1929.

Public Health Expenditures in Selected* Cities by Nonofficial Agencies

JAMES WALLACE, M.D., F.A.P.H.A., AND LOUIS FELDMAN

*Committee on Administrative Practice, American Public Health Association,
New York, N. Y.*

IN previous articles of this series official public health expenditures in cities participating in the annual Inter-Chamber Health Conservation Contests have been analyzed. Consideration will now be given to public health expenditures of nonofficial agencies. The material herewith presented is derived from the same source—the Health Conservation Contests—but does not cover precisely the same cities as were included in the discussion of official expenditures for the reason that only a limited number of cities presented reasonably adequate data on nonofficial expenditures.

The services† covered in the totals for nonofficial expenditures are identical with those included in the discussion of official expenditures in preceding articles but in the case of nonofficial expenditures it has been impossible to analyze them by specific services because of the infrequency with which they were reported in sufficient detail.

In each of the preceding articles attention was called to certain limitations of interpretation which must be exercised in the use of material presented. Even greater caution should be exercised in the use of figures presented on nonofficial expenditures. A reasonably reliable figure on the average per capita expenditure for public health from nonofficial sources would be most desirable and useful. This is not possible from the data at hand. Figures presented in this article deal with a definitely limited group of cities, and the discussion will therefore be limited to nonofficial expenditures and their relationship to official expenditures in these cities. These figures must not be interpreted as necessarily portraying average per capita public health expenditures from nonofficial sources for the country as a whole. With these words of caution we may proceed to a discussion of the figures.

NOTE: This is the fourth article based on the Report of the Sub-committee on Current Practices of Health Departments of the Committee on Administrative Practice. The members are: Joseph W. Mountin, M.D., *Chairman*, E. L. Bishop, M.D., Louis I. Dublin, Ph.D., Allen W. Freeman, M.D., George T. Palmer, Dr.P.H., John L. Rice, M.D., and W. Frank Walker, Dr.P.H. Former articles by Dr. Mountin appeared in March and May *Journals* and an article by Dr. Walker in the July *Journal*.

* These cities were not selected voluntarily but rather by necessity. The group includes only those cities for which satisfactory data on nonofficial expenditures were available.

† Services included in the totals for both official and nonofficial expenditures are: administration, vital statistics, general sanitation, food, drugs, and milk, child health supervision (including maternity, infancy, preschool and school health services), communicable disease, tuberculosis, venereal disease and laboratory.

TABLE I
OFFICIAL AND NONOFFICIAL EXPENDITURES
FOR HEALTH SERVICES *
IN CERTAIN AMERICAN CITIES
FOR THE YEARS 1930-1934

Year	Number of Cities Reporting	Population † Represented	Expenditures by		Per Capita (in cents)	
			Official Agencies	Nonofficial Agencies	Official	Nonofficial
1930	55	14,575,591	\$12,546,091.94	\$8,680,728.02	86.1	59.6
1931	59	16,526,250	14,537,367.22	9,880,147.22	88.0	59.7
1932	56	15,959,854	13,795,876.37	7,344,014.23	86.4	46.0
1933	49	14,076,179	10,973,754.20	6,135,657.53	78.8	43.6
1934	45	9,657,708	8,416,721.43	4,664,073.50	87.2	48.3

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal and capital expenditures and deficits.

† 1930 Census.

Official expenditures include Board of Education but not expenditures for physical education or health instruction by teachers.

Nonofficial expenditures are for the same services as official expenditures, the funds for which are derived from sources other than taxation.

Table I gives official and nonofficial expenditures for health services in certain American cities for the years 1930-1934. This table includes only those cities whose schedules for the Health Conservation Contest included reasonably complete data on both official and nonofficial expenditures. Because of the inadequacy of reporting nonofficial expenditures in cities of the lower population groups, only cities of over 50,000 population have been included in this table. The cities reporting for each of the several years are not always the same. As a matter of fact, only 27 cities reported consistently during each of the 5 years for which figures are presented.

This table indicates that during 1930 in a group of 55 selected cities (cities of over 50,000 population which competed in the Health Conservation Contest and submitted satisfactory data on nonofficial expenditures), official public health expenditures averaged approximately 86 cents per capita, and nonofficial expenditures about 59 cents. Official expenditures declined from a high of 88 cents in 1931, to a low of 78.8 cents in 1933, a reduction of 11 per cent, and then made some recovery, to 87.2 cents in 1934. Nonofficial expenditures reached a high of 59.7 cents

per capita in 1931, and declined to 43.6 cents in 1933, a reduction of 27 per cent, and then experienced a slight increase to 48.3 cents in 1934. It should be borne in mind that when comparing the group of cities in 1930 with the group in 1933 and 1934, somewhat similar, but not in all instances the same, cities are being considered.

A study of the individual cities which are included in this table indicates that the recovery noted in 1934 was due principally to an increase in expenditures in cities of over 500,000 population, and that this increase was not uniformly experienced in the smaller cities, particularly in the case of the nonofficial agencies.

Table II gives both official and nonofficial expenditures in the 27 cities which made reasonably adequate reports for each of the 5 years 1930-1934. This table quite obviously provides a more reliable basis for comparison than does Table I since only those cities which reported continuously for 5 years are included. On the other hand, fewer cities are being considered and the group is more highly selected from several points of view.

It will be noted that in this selected group of cities (cities of over 50,000 population which competed in the

TABLE II
OFFICIAL AND NONOFFICIAL EXPENDITURES
FOR HEALTH SERVICES *
IN THE SAME CITIES REPORTING
FOR THE FIVE-YEAR PERIOD 1930-1934

Year	Number of Cities Reporting	Population † Represented	Expenditures by		Per Capita (in cents)	
			Official Agencies	Nonofficial Agencies	Official	Nonofficial
1930	27	7,278,316	\$7,349,852.52	\$4,663,309.40	101.0	64.0
1931	27	7,278,316	7,683,036.54	4,861,062.36	105.5	66.8
1932	27	7,278,316	6,915,409.30	3,555,652.86	95.4	48.9
1933	27	7,278,316	6,433,350.98	3,545,931.88	88.4	48.7
1934	27	7,278,316	6,699,449.28	3,685,646.96	92.0	50.6

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal and capital expenditures and deficits.

† 1930 Census.

Official expenditures include Board of Education but not expenditures for physical education or health instruction by teachers.

Nonofficial expenditures are for the same services as official expenditures, the funds for which are derived from sources other than taxation.

Health Contest and submitted satisfactory data on both official and non-official expenditures for each of the 5 years) official per capita expenditures reached a high point of 105.5 cents in 1931, declined to 88.4 cents in 1933, a reduction of 11.9 per cent, and rose to 92.0 cents in 1934. Nonofficial expenditures reached a high of 66.8 cents in 1931 and declined to a low of 48.7 cents in 1933, a reduction of 27.1 per cent, and then rose slightly in 1934 to 50.6 cents.

In 1931, the high point for both official and nonofficial expenditures, the average total per capita public health expenditure in these 27 cities was 172.3 cents. Of this amount 105.5 cents, or 61.2 per cent, came from official, that is, tax supported sources; and 66.8 cents, or 38.8 per cent, from the non-official agencies.

In 1933, the low year for the combined expenditures, the average total per capita expenditure was 137.1 cents of which 88.4 cents, or 64.5 per cent, came from official sources and 48.7 cents, or 35.5 per cent, from nonofficial sources.

In 1934, total expenditures averaged 142.6 cents per capita, of which 92.0 cents, or 64.5 per cent, came from official and 50.6 cents, or 35.5 per cent, from nonofficial sources.

In addition to the limitations which have already been mentioned, there are a number of other points which should be considered in attempting to interpret these figures.

Both Tables I and II contain a more highly selected group of cities than even the remarks made with respect to them would seem to indicate. That this is true seems to be borne out by the fact that the official per capita expenditures as reported in these tables are appreciably higher than those reported in any of the tables of the preceding articles. This is due to the fact that the figures presented in this paper are limited to cities of over 50,000 population which have submitted reasonably adequate data on *both* official and non-official expenditures and, in the case of Table II, to the 27 cities which submitted these data continuously for 5 years. Both of these groups, and particularly the group in Table II, consist of those cities with the more highly developed health programs and the highest per capita expenditures. They are not necessarily typical of the country as a whole.

The figures presented on nonofficial expenditures even in this special group are probably somewhat higher than they actually would be if all the facts with respect to them were known. It

TABLE III

TOTAL AND PER CAPITA OFFICIAL AND NONOFFICIAL EXPENDITURES FOR HEALTH SERVICES * IN 27 CITIES
ACCORDING TO GEOGRAPHIC LOCATION FOR THE 5 YEARS 1930-1934

Geographic Section	Year	Number of Cities Reporting	Population † Represented	Expenditures by		Per Capita (in cents)	
				Official Agencies	Nonofficial Agencies	Official	Nonofficial
Eastern ‡	1930	1	53,569	\$ 42,515.00	\$ 7,560.00	79.4	14.1
	1931	1	53,569	27,416.00	11,860.00	51.2	22.1
	1932	1	53,569	24,526.00	11,860.00	45.8	22.1
	1933	1	53,569	26,419.00	9,870.00	49.3	18.4
	1934	1	53,569	28,608.00	11,583.00	53.4	21.6
Northeastern ‡	1930	17	5,529,795	6,019,793.20	4,071,470.90	108.9	73.6
	1931	17	5,529,795	6,382,195.26	4,201,333.70	115.4	76.0
	1932	17	5,529,795	5,770,327.77	3,016,181.76	104.3	54.5
	1933	17	5,529,795	5,234,344.66	3,011,667.67	94.7	54.5
	1934	17	5,529,795	5,418,817.00	3,058,758.46	98.0	55.3
Southeastern ‡	1930	1	270,366	268,620.00	88,906.00	99.3	32.9
	1931	1	270,366	271,720.00	86,393.00	100.5	31.9
	1932	1	270,366	243,008.00	75,344.00	89.9	27.9
	1933	1	270,366	227,449.26	85,500.00	84.1	31.6
	1934	1	270,366	257,747.00	142,815.35	95.3	52.8
South Central ‡	1930	2	423,922	298,229.22	83,255.28	70.4	19.6
	1931	2	423,922	317,848.86	93,008.61	75.0	21.9
	1932	2	423,922	273,201.35	66,993.93	64.4	15.8
	1933	2	423,922	282,707.32	53,544.77	66.7	12.6
	1934	2	423,922	286,316.85	55,816.92	67.5	13.2
North Central ‡	1930	4	784,311	537,842.81	326,059.78	68.6	41.6
	1931	4	784,311	507,099.97	355,386.97	64.7	45.3
	1932	4	784,311	454,799.29	288,988.74	58.0	36.8
	1933	4	784,311	509,981.13	311,283.42	65.0	39.7
	1934	4	784,311	537,042.48	330,700.25	68.5	42.2
Western ‡	1930	2	216,353	182,852.29	96,057.44	84.5	44.4
	1931	2	216,353	176,756.45	113,080.08	81.7	52.3
	1932	2	216,353	175,678.52	96,284.43	81.2	44.5
	1933	2	216,353	152,449.61	74,066.02	70.5	34.2
	1934	2	216,353	170,917.95	85,972.98	79.0	39.7

* Exclusive of hospitalization, institutional care, medical relief, garbage collection and disposal and capital expenditures and deficits.

† 1930 Census.

‡ *Northeastern:* Connecticut, Illinois, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Wisconsin.

Eastern: Delaware, Kentucky, Maryland, North Carolina, Tennessee, Virginia, West Virginia.

Southeastern: Alabama, Florida, Georgia, Mississippi, South Carolina.

South Central: Arkansas, Louisiana, New Mexico, Oklahoma, Texas.

North Central: Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Wyoming.

Western: Arizona, California, Idaho, Nevada, Oregon, Utah, Washington.

Official expenditures include Board of Education but not expenditures for physical education or health instruction by teachers.

Nonofficial expenditures are for the same services as official expenditures, the funds for which are derived from sources other than taxation.

is possible, for example, that duplication of figures may have occurred, such as where a voluntary agency is subsidized by an official agency and the amount of such subsidy may be included in both the official and non-official expenditures; overstatement of the proportion of hospital outpatient expenditures which should be included under the Contest definition of health

services; and the possible inclusion of expenditures which, according to the Contest's definition of public health, should not have been considered as public health services, such as a fund for purchasing milk, or certain elements of general medical service. While the amount of these errors, at least as expressed as a percentage of the total, would not in all probability

be great, it may make the figure somewhat higher than the true one. Unfortunately the exact extent of these errors cannot be determined for the reason that so few cities have reported their nonofficial expenditures in sufficient detail to permit the necessary analysis.

Table III, giving official and nonofficial expenditures in the same 27 cities as were presented in Table II, but divided according to geographic location, shows that the figures in Table II are largely determined by the cities of the northeastern area of the country and seem to account partially for the relatively high expenditures given in all tables. Figures by geographic location, although based on too few cities to give a reliable picture in all areas except the northeastern, parallel each other sufficiently closely to indicate that the trends as shown in Table II are probably consistent for the country as a whole.

While it would be impossible in the short space of this article to analyze the extent to which various health services are supported in whole or in part by nonofficial agencies, it seems quite certain that bedside nursing,* public health nursing, food and milk control, child health supervision, and tuber-

culosis control and prevention, constituted the most important contributions of the nonofficial agencies.

SUMMARY

In a selected group of cities having well organized health services and much higher than average total per capita health expenditures, the nonofficial agencies contributed in 1931 nearly 40 per cent of funds used for the support of selected health services considered in this article. In 1934 in this same group of cities the nonofficial agencies contributed 35 per cent of the funds used for the same purpose. Nonofficial expenditures averaged (in the group of 27 cities given in Table II) 66.8 cents per capita in 1931, and dropped to 48.7 cents per capita in 1933, a reduction of 27.1 per cent. While both official and nonofficial expenditures have experienced a drop since 1931, the decline in the nonofficial agencies has been much sharper than in the official agencies.

The possible inaccuracies which enter into the reporting of nonofficial expenditures and the incompleteness and inadequacy with which such reports are made point to a necessity for better reporting. There is need, in the nonofficial, as there is also in the official, field for better definitions of services, more nearly universal reporting of nonofficial expenditures, and for allocation of such expenditures according to specific health services.

* It is recognized that bedside nursing, if properly carried on, should include public health nursing, but the distinction is made here to differentiate between an organization which carries only bedside nursing from one that carries a health supervision service.

New Germany Teaches Her People

An Account of the Health Exposition of Berlin

H. E. KLEINSCHMIDT, M.D., F.A.P.H.A.*

Director, Health Education, National Tuberculosis Association, New York, N. Y.

HEALTH expositions have the reputation of being tawdry, superficial, and of questionable value. That reputation does not apply to the Berlin health exposition of 1935. It commanded attention without ballyhoo, interpreted health to the people without vulgarizing facts, and roused the people to a sense of citizen-duty in the "new" Germany.

German cities are "museum conscious." To operate an exposition is no great risk—attendance is assured, and skill in installing it is readily at hand. This one aptly called "Das Wunder des Lebens," was carefully planned well in advance. The long experience and expert workmanship of the German Hygiene Museum at Dresden assured the success of the enterprise from the beginning. The new government gave it strong support; excellent publicity made it known to all the people. It is no wonder that on some days the attendance reached 30,000, though the admission fee was fairly high. The exposition ran for 6 weeks, March 23 to May 5, 1935. Income from fees and from concessionaires was considerable, yet not enough to

meet entirely the enormous cost of manufacturing the exhibits and of manning the exposition.

One hesitates to describe the exposition in words; a suggestive outline must suffice. The visitor, after passing through one of four turnstiles, enters the Honor Hall, a vast, impressively empty vestibule. In front of him and occupying the entire wall he sees only a monumental relief frieze depicting the onward and upward sweep of a nation, led by a giant eagle. With no noise to distract his attention (for the floors are covered with carpet), with no objects in the hall except a few slender pillars from which hidden lights softly illuminate the hall, his attention is concentrated on this one picture in stone. Without being told, he "feels" rather than learns, that what he is about to see is of vital concern to the nation—a vast group-yearning toward a high goal and that he is a participant in it.

From this "experience" he next passes into a large, high ceilinged, dimly lighted room. An inscription in gold letters on the wall, quotes Augustinus: "Men marvel at the roaring sea, at flowing waters and at the spectacle of the heavens, and in their wonder forget the wonder they are themselves." On a pedestal occupying a rotunda is the transparent man, arms uplifted in the attitude of the "Praying Boy" celebrated by Goethe. There is nothing to divert the

* Traveling as a fellow of the Carl Schurz Foundation the author visited the health exposition held in Berlin in the spring of 1935. To Dr. Bruno Gebbard, who attended the meeting of the Association at Pasadena, and who was the scientific director of the exposition, he is indebted for numerous courtesies and lucid explanations.

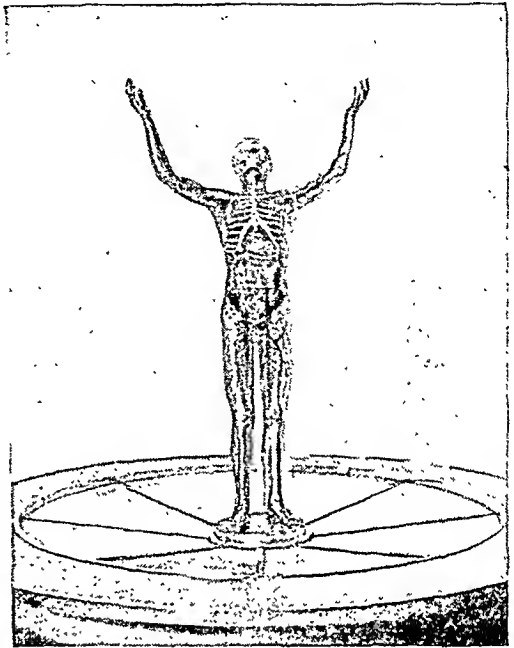
attention from this one work of art. For a moment one enjoys the sheer beauty of the human body. Then the organs light up, one by one, and the concealed voice of the phonograph tells the story.

Passing out of this sanctuary, the visitor's eyes are dazzled by an array of colorful exhibits, many of them blinking or moving. The center area is like an open boulevard sweeping toward a wide staircase at the further end, which leads gracefully to a splashing fountain. This is the main hall and the heart of the exposition. Anatomy and physiology are the subjects taught, by means of models, instruments, and pictures.

Each subdivision is so designed as to convey atmosphere (*stimmung*) as well as exact information. The motif of the section on respiration, to cite an example, is lightness or airiness, with blue and silver, the predominating colors. The note of the section on circulation, is strength and elasticity; red and black are the dominant colors.

Ingenuous devices give a conception of area, extent, and function of the various organs. For instance, a cage made of tennis netting shows the volume of air breathed in a day; a large rectangular area on the ceiling, painted red, shows the surface that might be covered with the hemoglobin of one person; a table, the four legs of which are as many tibiae, support the weight of 20 men; piles of groceries and provisions show how much food one man consumes in a year; and so on.

Huge models of single organs, with careful detail, attract the eye. A giant ear rocks back and forth to demonstrate the mechanism of the semi-circular canals; an eye of the same proportions offers one an opportunity to see how the lens reflects images on the retina; a huge brain fitted out with push buttons shows what parts of the body each section of the brain



The Transparent Man

regulates. There is a "smelling table" where one can test his sharpness of scent; a skin-color scale with a mirror arrangement so that one may classify his own complexion; a dozen or more respirators for those who wish to test their lung capacity. There is an apparatus for testing color perception and, incidentally, the technician in charge is gathering valuable research data on color-blindness from the hordes of people who come for a tryout. To "do" everything in this hall in a hurried tour requires at least an hour; to study and understand it all would easily consume 4 or 5 solid hours of a nimble-witted person's time, in spite of the fact that the ideas are skillfully portrayed so as to be grasped easily and quickly. Much of the material in this hall is a duplication of the contents of the Dresden Museum, though some of the exhibits are improvements, and some entirely new.

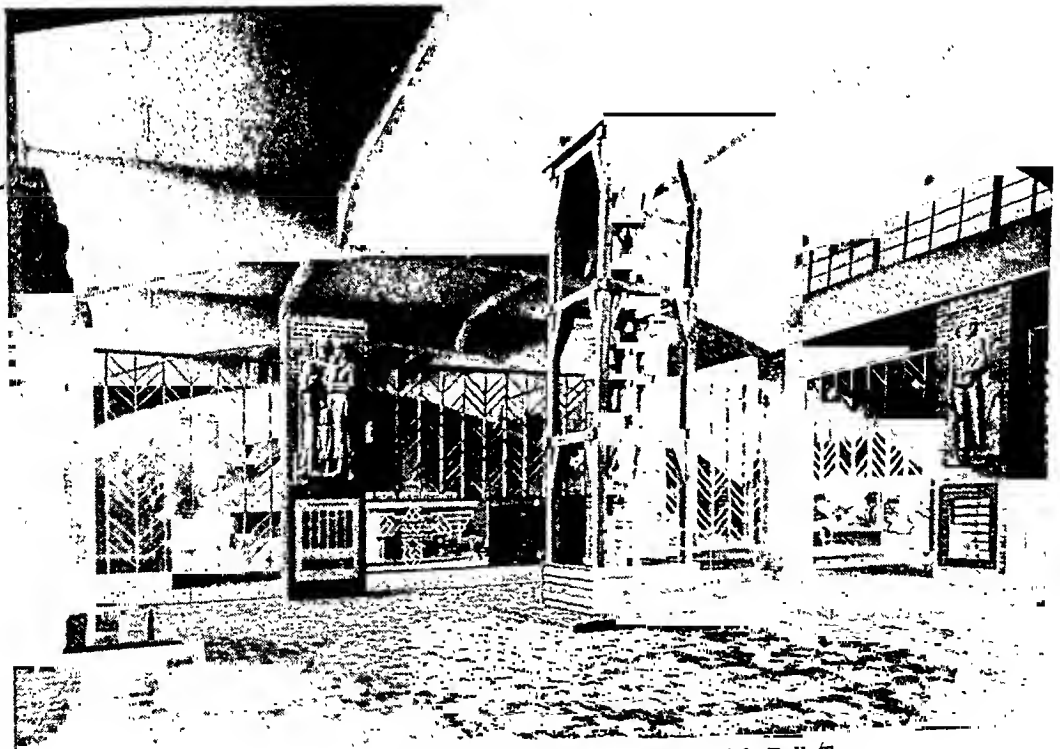
The visitor passes from this hall up a broad stairway to a balcony restaurant, where, while refreshing himself, he surveys the kaleidoscopic yet orderly display he has just visited.

Hard by the main hall is the Microvarium, an enclosed arena, the cylindrical wall of which is the screen on which epidiascope pictures are shown in succession. In the center of the room and elevated about 10 feet is the laboratory where biological specimens are preserved and prepared for the 'scope. A gallery surrounding the laboratory is the stage for 8 epidiascopes, each operated by a technician. As the specimens, alive and squirming, are shown on the screen, one after another, an attendant explains them to the group of some 30 persons passing along the wall.

The next great hall has to do with race hygiene; "The Carriers of Life" it is called. Again the visitor is "put in tune," this time by a unique bell tower made of rough hewn timbers and rising loftily out of a semi-enclosed area, the boundaries of which are marked off by symbolical bas-reliefs of heroic proportions. Every 5 minutes

a huge hour glass in the lower compartment of the open tower, its sand having run out, turns over. It marks the death of 7 Germans. But instantly a nursery song rings out from the set of porcelain bells in the upper tower. Cheerfully these announce the birth of 9 German babies. Again and again the visitor hears the tinkle of the bells—forcefully reminding him of Germany's vital statistics.

The rest of the exhibits of this hall, with a few exceptions, do not compare favorably from a technical standpoint, with those of the main hall. The exhibits are crowded, sometimes dull and arranged in poor taste. Posters, none too well lettered, sermonize too much, and complicated organization charts confuse. The reason for this inferior exhibit technic, one surmises, is that this hall represents the handiwork of newer government personnel, who have not yet had much experience in graphic display. The subject matter deals



Vestibule to Exhibit on "The Carrier of Life" with Bell Tower

primarily with race hygiene. Eugenics charts and family trees abound. Sad galleries of unfortunate biological misfits—idiots, people with heritable deformities, incurable criminals—drive home the logic back of the new sterilization laws. The anti-Semitic policy is meticulously explained. Exhibits depicting Germany's falling birth rate betray what a sore problem this is to the new state; and, as a corollary what Germany expects of her young matrons is made clear in no uncertain phrases. To a foreigner interested in the present psychology of the German people and in the methods of public propaganda bureaus, this hall is, of course, a treasure house and more illuminating than pages of printed matter or folios of documents.

Public health occupies a hall called "The Maintenance of Life." It attempts to show the facilities of the government, including occupational therapy and curative medicine as well as the sanitary and educational activities of the Nazi party.

Another great hall deals with the emigration problem. In East Prussia, one learns, there is much unused land and a shortage of inhabitants. To populate this area the government offers homesteads to married couples of good heritage (as interpreted by the government) who have a desire to rear large families. In this hall there is a full sized model of the house that is offered by the government to young married persons, fully furnished, including even growing fruit trees and a cunning family of goats. Here, a number of the public welfare projects are also shown in good technic.

In the next hall are the commercial exhibits and these are much like those we see in America. Firms dealing in foods, clothing, household equipment, and so forth, occupy booths, distribute samples, and cry their wares. Originally there was some question as to whether

commercial concerns should be permitted to exhibit, but the management decided, wisely I think, to include them. A "health" show, an official explained to me, would attract the health cranks, but the lure of free samples, attractive displays of furniture, food, and what not, brings in the mothers and fathers, many of whom would not have come for a health exhibit alone.

IMPRESSIONS

A few impressions which strike the American (prejudiced by past experience with health expositions) may be worth noting. First there is the excellent advantage taken of open space. Space is valuable and the temptation of the exhibitor is to "cover" every inch of it. The German exhibitor, however, uses space to direct attention to what is important. The vast emptiness of the vestibule (Honor Hall) is impressive and one's attention is concentrated on the frieze. The chapel-like space occupied by the transparent man creates an attitude of respect, if not awe. The broad avenue looking toward the rising staircase and the fountain, enhances the effect of commotion and liveliness of the exhibits which bound it on each side.

All floors are covered with a silencing matting. One is not disturbed by the clatter of countless feet, or tempted to litter the floor with pamphlets and orange seeds. This one nicety of technic, though it cost thousands of dollars, is well worth its price and is cited as an example of the attention to detail.

The attempt always to establish atmosphere in consonance with the particular exhibit is, as mentioned before, praiseworthy.

The opportunity to press buttons, pull levers, test one's physical abilities and in general to "play" with the exhibits is a grateful relief to the sight-



A Section of Exhibit on Respiration. Netting and Color Scheme of Silver and Blue Are in Keeping with the Nature of the Exhibit

seer who has walked miles of musty galleries dotted with "don't touch" signs.

The Microvarium is a unique feature, instructive and fascinating. The conducted tours, the illustrated lectures, and the personal demonstrations have fine pedagogical value.

The opportunity to rest in the refreshment halls and the several movie auditoriums is appreciated by the foot-weary.

The excellent advertising and publicity campaign was equal to, if not better than, similar efforts we customarily make in the United States, and served to spread information widely among those who never saw the exhibit.

VALUE OF EXHIBIT

An attempt to appraise the political and social value of the exposition as a whole, would be too ambitious. It is enough to say that the success of the enterprise as an exposition was unquestioned, for it reached some three-

quarters of a million people in 6 weeks, entertained and instructed them, and undoubtedly stimulated an interest in the aims of the new government. Limiting the discussion to that part of the exposition which had to do with scientific biology, what shall we say as to the ultimate value of the teaching methods employed? In America some of us are skeptical of the purely informational type of teaching, even when that is coupled with appeals to the emotions. What springs of motivation, we may ask, are set going by a knowledge of how food is digested, or how enduring the heart is, or why epileptics should be sterilized? Will an understanding of endocrine glands safeguard anyone's health? Is it useful for anyone to know that his bowels are 7 meters long, or that his capillaries, if laid end to end would reach from Budapest to Wherever?

All of these facts are interesting, but what is accomplished by teaching them? Certainly for a substantial proportion

of the population (more in Germany than in America, perhaps) this kind of teaching is extremely valuable, in that it awakens interest, supplies basic information in easily understood form, and builds a substantial foundation of knowledge on which it will be easy later to construct a well rounded health attitude. The biologic knowledge so attractively presented, makes people receptive to modern medical ideas and lessens the resistance to public health practices. To an extent, it serves also to help people discriminate between sound and unsound health advice; to distinguish between scientific medicine and quackery. Above all, it impresses upon even the most casual the

"Wonder of Life," Admiration for the marvel of the human body, reverence for the mysterious thing we call life, is worth cultivating in this surfeited generation.

The expense of this kind of health education is admittedly heavy, as compared with the publicity campaigns common in our country. However, the greater permanence of the impressions made, the greater number of people reached and interested, doubtless justifies the expense. It is the kind of project that might best be financed by a bequest or foundation, the donors of which have faith in the power of knowledge, and generosity enough to let others reap where they have sown.

Cooking of Vegetables

FOUR series of samples of spinach, two of mustard, one of cabbage, and one of turnip tops were cooked by four different methods, and the losses in iron, copper and manganese, and total solids were ascertained. The methods employed were boiling in 2 liters of water; boiling in 4 liters of water; steaming; cooking under 15 pounds pressure. The average losses for iron for these methods were, respectively, 27, 34, 4 and 8 per cent; for copper 29, 34, 9 and 16 per cent; for man-

ganese 32, 48, 6 and 13 per cent; for total solids 24, 32, 6 and 11 per cent. It was found that the greatest losses were obtained when the vegetables were boiled, while the smallest losses occurred with steaming or pressure-cooking methods. As a means of introducing these minerals into the diet, steaming and pressure cooking are, therefore, to be recommended in the preparation of vegetables.—F. Bartow Culp, and J. E. Copenhaver, *J. Home Econ.*, May, 1935, page 308.

Standardization of the Methylene Blue Reduction Test by the Use of Methylene Blue Thiocyanate*

H. R. THORNTON, PH.D., † AND R. B. SANDIN, PH.D.

*Departments of Dairying and Chemistry, University of Alberta,
Edmonton, Canada*

SINCE the first use of methylene blue reduction as an indicator of bacteriological quality in milk, fluid milk supplies on this continent have undergone notable improvement. Moreover, during this period it has been shown that the inaccuracies in the test increase with increasing reduction times.^{6, 8, 9} An effort to minimize these inaccuracies is, therefore, worth while.

Because of the extensive use of this test in milk control activities, it becomes necessary to duplicate frequently the standard tablets of methylene blue certified by the Commission on Standardization of Biological Stains and recognized by the American Public Health Association in *Standard Methods of Milk Analysis*.¹ This duplication involves not only the creation of standards but also the purification or, at least, the determination of purity of the dye. Clark, Cohen, and Gibbs² review the difficulty, if not the impossibility, either of purification or of determination of purity of methylene blue chloride, the methylene blue salt used in these tablets.

The nearest present approach to an absolute color standard in this test is that the milk should be colored a robin's egg blue. Among 6 workers in this institution, each of whom has had considerable experience with the test, there was no unanimity of opinion as to what depth of color in milk constitutes "robin's egg" blue. At the request of the Chairman of the Commission on Standardization of Biological Stains an attempt has been made to develop more exact standards.

Drew and Head³ prepared methylene blue thiocyanate which crystallized from aqueous solution—but carrying no water of crystallization—with almost 100 per cent purity. This salt, therefore, seemed to offer some attractive advantages over the chloride and gave promise of being a satisfactory means of standardizing the methylene blue reduction test. The present authors prepared by a simple process¹⁰ methylene blue thiocyanate and tested it as a substitute for methylene blue chloride.

METHODS

Standard Methods of Milk Analysis was followed as closely as possible in the reduction test technic and reduction times are reported in hours and minutes, 1:15 meaning 1 hour and 15

* To be read at a Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

† Associate Referee, Committee on Standard Methods for the Examination of Dairy and Food Products.

minutes. Three dyes were used as follows:

1. *American*—The standard American Tablet, lot 2,360, purchased in the United States not later than 1924, one tablet being dissolved in 200 ml. of distilled water of which solution 1 ml. was added to 10 ml. of milk.

2. *Thiocyanate*—Methylene blue thiocyanate prepared by the present authors and used in varying concentrations.

3. *Danish*—Tablets purchased from Blauenfeldt and Tvede, Copenhagen, not later than 1916. Aqueous solutions of these tablets were added to 10 ml. of milk in a concentration identical to that used in Europe with 40 ml. of milk.

REDUCTION TIMES, POTENTIALS, AND POISING ACTION

When methylene blue thiocyanate is added to milk in a concentration giving the same depth of color as is observed in the standard test, the reduction times of the thiocyanate and the chloride are identical.¹⁰ These results were verified by a number of laboratories in the United States and Canada to which samples of the thiocyanate were distributed through the courtesy of the Chairman of the Commission on Standardization of Biological Stains.

No essential difference was found between the oxidation-reduction potential ranges over which the thiocyanate and the chloride reduce in milk or in aqueous solution on titration with titanous chloride. The poisoning action of the former dye is no greater in milk than that of the latter.

CONCENTRATION

In 1924 Hastings⁴ reported that the Danish technic resulted in a depth of color in milk the approximate equivalent of 1 part of crystalline methylene blue chloride (of unreported purity) in 200,000 parts of milk. When 5 Danish tablets were each dissolved in 200 ml. of water the aqueous solutions varied in color depth between 67 and 100 color units. The American tablets were found to be 40–46 per cent of their

intended strength. It may be assumed, therefore, that in the standard American test the dye concentration in the milk is approximately 1:465,000.

In the present study aqueous solutions of methylene blue thiocyanate were prepared with concentrations of 1:20,000. Duboscq colorimeter comparisons of these solutions with aqueous solutions of Danish and American tablets were made. When 4 Danish tablets were each dissolved in 200 ml. of distilled water, the concentrations of the solutions in terms of methylene blue thiocyanate were as low as 1:4,761 and as high as 1:4,000, the average being 1:4,440. By computation the concentration of dye in milk in the test as carried out in Europe would vary between 1:195,201 and 1:164,000, the average being 1:181,050.

When compared with thiocyanate in a similar manner American tablets when dissolved in 200 ml. of distilled water varied in concentration between 1:69,561 and 1:60,377, the average of 5 being 1:64,468. By computation the concentration of dye in milk in the American test varies between 1:765,215 and 1:664,147, averaging 1:709,148. This variation is, therefore, greater than 15 per cent. Working independently and using dye from two different preparations the writers were able to check each other with respect to methylene blue thiocyanate concentrations to within 3.25 per cent.

When methylene blue thiocyanate was added to milk in a concentration of approximately 1:700,000 the same depth of blue resulted as is observed in the standard American test. Burkey reports⁵ that the concentrations which would more nearly compare with the standard American solution in milk were 1:480,000 and 1:560,000 respectively for two preparations of methylene blue thiocyanate. No attempt is made to explain the discrepancies in the results of the three groups of

workers but the difficulty of establishing a color standard based upon the depth of blue in the milk is at once apparent.

That the milk was lighter in color than expected was noted immediately the original tablets were placed on the market. This lack of depth of color gives rise to more serious trouble in Alberta than in any other area in which the writers have had experience. Practical operators of the test frequently use 2 and, at times, 3 ml. of the standard dye solution per 10 ml. of milk. There can be no question of the necessity for increasing the dye concentration in the test in this province. As Hastings⁴ has pointed out there seems to be no reason for accepting on this continent the European standard of dye concentration. The amount of dye used should be the minimum required to give a sharp end-point because increased concentration results in increased poisoning and lethal actions. We are of the opinion that a concentration of 1 part of dye to 300,000 parts of milk is satisfactory.

There is a present and growing need for standardizing the methylene blue reduction test as applied to sweet cream. As a step in this direction Macy⁷ recommends using a dye solution of triple strength. We have found that when methylene blue thiocyanate is added to cream in a concentration of 1:300,000, the color approximates rather closely that obtained in the technic suggested by Macy. It is advantageous to use the same dye solution for cream as for milk.

This increase in dye concentration will result in increased reduction times for most milks. The average increase for 25 milks of varying bacteriological quality was found to be 30 minutes when a methylene blue thiocyanate concentration of 1:300,000 was used (Table I). The differences may be due to greater lethal and poisoning action or color depth. Because the increased re-

duction time tends to be constant in all classes of milk, greater depth of color may be the main factor.

TABLE I

AMERICAN AND DANISH REDUCTION TIMES COMPARED WITH REDUCTION TIMES OF METHYLENE BLUE THIOCYANATE IN A CONCENTRATION OF 1:300,000

Milk Number	American	Thiocyanate	Danish
1	1:00	1:15	1:15
2	1:00	1:15	1:15
3	4:30	5:30	5:15
4	4:30	5:30	4:30
5	4:45	5:15	5:15
6	5:15	5:45	5:45
7	5:15	6:00	6:00
8	5:30	6:15	6:00
9	5:45	6:15	6:15
10	5:45	6:45	6:45
11	5:45	6:15	6:15
12	6:00	6:30	6:45
13	6:45	8:00	8:00
14	7:00	7:15	7:00
15	7:00	8:00	8:00
16	7:00	8:00	8:00
17	7:00	8:00*	8:00
18	7:00	8:00	8:00
19	7:45	8:00	8:00
20	8:00	8:30	8:30
21	8:00	8:30	8:30
22	8:30	9:00	9:15
23	8:30	9:00	9:15
24	8:30	8:30	9:15
25	9:00	9:15	9:30
Average	6:13	6:43	6:49

RECOMMENDATIONS

Exact standards for the methylene blue reduction test are becoming increasingly important. The inadequacy of the present empirical dye standards rests largely upon the difficulty of purification and determination of purity of methylene blue chloride.

Therefore, it is recommended that—

1. Methylene blue thiocyanate be substituted for methylene blue chloride in the standard tablets used in the methylene blue reduction test because of the reproducibility of the former dye.

2. One part of dye to 300,000 parts of milk be adopted as the standard concentration in this test.

REFERENCES

1. *Standard Methods of Milk Analysis*, Sixth Edition, 1934. American Public Health Association.
2. Clark, W. M., Cohen, B., and Gibbs, H. D. *Studies on Oxidation-reduction. VIII. Methylene Blue. Reprint 1017, Pub. Health Rep.*, 1925.
3. Drew, H. D. K., and Head, F. S. H. *Deriva-*

tives of Methylene Blue. *J. Chem. Soc. London*, 248-253 (Mar.), 1933.

4. Hastings, E. G. The Standardization of the Methylene Blue Reduction Test for Milk Control Work. *13th Annual Report Internat. Assn. Dairy and Milk Inspectors*, 1924, pp. 268-275.

5. Burkey, L. A. Unpublished report to the Commission on Standardization of Biological Stains, 1934.

6. Johns, C. K. A Modification of the Methylene Blue Reduction Test and Its Comparative Value in Estimating Keeping Quality of Milk. *Sci. Agri.* 11:171-190, 1930.

7. Macy, H. Experiments With the Methylene Blue Reduction Test for the Grading of Sweet Cream. *Minnesota Agri. Exper. Sta. Bull.* 310, 1934.

8. Skar, O. Verhalten der Leukoxyten der Milch bei der Methylenblau-Reduktaseprobe. *Ztschr. f. Fleisch u. Milchhyg.* 23:442-447, 1913.

9. Thornton, H. R., and Hastings, E. G. Studies on Oxidation-reduction in Milk. The Methylene Blue Reduction Test. *J. Dairy Sci.* 13:221-245, 1930.

10. Thornton, H. R., Sandin, R. B., and Miller, C. S. The Substitution of Methylene Blue Thiocyanate for Methylene Blue Chloride in the Reduction Test of Milk. To be published.

ACKNOWLEDGMENTS—We wish to acknowledge with thanks, help and encouragement from H. J. Conn, Ph.D., Chairman, Commission on Standardization of Biological Stains, and R. S. Breed, Ph.D., Chairman, Committee on Standard Methods for the Examination of Dairy Products. We are grateful also to Dr. L. A. Burkey, Bureau of Animal Industry, U. S. Department of Agriculture, C. K. Johns, Division of Bacteriology, Canadian Department of Agriculture, and Professor E. G. Hastings, University of Wisconsin, for testing samples of methylene blue thiocyanate prepared by us.

Control of Rabies

HERETOFORE reliance in the control of rabies has unwisely and almost exclusively been placed in regulations which were difficult of enforcement. Future action, to be effective, must embrace educational efforts, primarily involving the dog owner but also extending to the general public. It is also to be hoped that success may be reached in preparing an effective vaccine against canine rabies.

Inasmuch as the muzzling of dogs, as a practical measure, is attended by difficulties, while leashing as a substitute is now on trial, the responsibility for bites should be placed squarely upon each dog owner. In any event, a city should be fully compensated for its financial outlay in preventing human and canine rabies. An adequate pro-

gram includes persistent, all-year effort in ridding the community of stray and unlicensed animals. For this purpose a sufficiently large individual dog tax should be imposed.

The writer believes that each person bitten should receive compensation, whether the bite is provoked or unprovoked. A dog bite, frequently involving pain, fright, torn clothing, a doctor's bill, and sometimes hospital treatment, is a distressing experience. Moreover, a course of prophylactic injections is an ordeal, particularly for children.

If the owners of biting dogs were sufficiently penalized, there would be a marked and rapid reduction in occurrences.—Robert Olesen, *Public Health Rep.*, Aug. 16, 1935.

Campaign Against Tuberculosis in College Students*

CHARLES E. SHEPARD, M.D.

Director, Men Students' Health Service, School of Hygiene and Physical Education, Stanford University, Calif.

THE campaign against tuberculosis is beginning to receive the serious attention of college administrators and college physicians. Prevention and early identification of tuberculosis presents a challenge to physicians who are interested in the prevention and early care of illnesses which bring disability upon students. A college education represents considerable investment of money and educational resources which cannot be realized in terms of disabling illnesses or premature cessation of the college course. Conditions imposed upon the boy or girl in college who breaks down with tuberculosis before graduation cause serious economic losses to the individual, to the college, and to the community. Since there are nearly 1,000,000 young men and women now attending our American colleges and universities, we are justified in asking what the colleges can do, and what they are doing, to reduce such tragic accidents as tuberculosis.

Although most students live healthy and well adjusted lives in college, there are certain factors in the environment which may encourage the development of tuberculosis. Important points in the tuberculosis prevention programs of our associations, such as, regulated living, adequate food, rest, sleep, and

freedom from stresses are sometimes not observed by college students. These young people are at an age and in an environment where the rules of healthful living may be loosely observed and where guidance from parents and the family physician is often not available. Academic competition is keen; ambition for accomplishment is high; and in these days there is often the need to carry outside work for self-support. There is furthermore a tendency to seek medical advice late rather than early. The college should therefore provide some form of medical supervision which will guide the student toward early medical care and a closer observation of those health rules which help to prevent tuberculosis.

The college age should be further emphasized as an age where tuberculosis is still claiming many victims. This disease causes more deaths between the ages of 15 and 45 than any other disease, with actual deaths reaching the high point for all ages between 20 and 24. Mortality rates show a slightly different picture, but here again the death rates increase rapidly between 10 and 20 and the high point for women is between 20 and 24. We are all familiar with the striking decline in death rates from this disease in recent years, and there has been a consequent decline in rates of the young adult age groups, except that the decline has been less for young women

* Read at the Sixth Annual Meeting of the Western Branch, American Public Health Association, in Helena, Mont., July 1, 1935.

than for young men. A study of the percentage decline reveals that the greatest reductions have occurred from birth to 14 years, and in the age groups from 25 to 64, while the smallest decline has occurred in the aged and in young people between 15 and 24. This is the age group in which life holds the greatest promise, the present seems happiest, and the future brightest. In this age group the decline in deaths has been too small and here the present and future campaign against tuberculosis should be concentrated.

It might be concluded from these statements that colleges must be sending into sanatoria and into the care of chest specialists, great numbers of victims each year. Since this is not true, we might assume that the number of undiscovered cases in colleges is fairly large. Preliminary studies in certain colleges indicate that such is the case and show that the tuberculosis problem is one which presents to the college a serious responsibility and to the college physician a worthy challenge.

Colleges are meeting this responsibility as a part of a more general responsibility for the health of their students. Many colleges now have established health programs set up primarily to maintain and protect the health of students. The extent of activities in these programs depends upon local needs and resources of the institution, but all carry the following general activities: prevention of the spread of communicable disease, protection of the student against disabling illness or injury, formal and informal programs of health instruction, and encouragement of students toward the establishment of good health practices. These activities have become the functions of several departments or schools of the college, such as, the College Public Health Service, the Student Health Service, Department or School

of Hygiene, and the Department or School of Physical Education. In some colleges these departments are combined in one school, thus centering all health activities and services under one roof.

The need for adopting programs of prevention has been the outcome of rather discouraging experience with case finding in colleges. We have learned that few early cases of tuberculosis will be found if we depend upon the student with early symptoms to report. Too often when he reports to the Health Service with symptoms he is found to have a well advanced lesion, which means a long period of illness for him and exposure of his associates over a period before the lesion was recognized. In the past 2 years at Stanford University, with a health program which encourages the students to report early, we have picked up only 3 early cases of tuberculosis among those coming with symptoms. Two of these reported because of hemorrhage. Moderately advanced lesions, or lesions with cavitation, were found in all others who reported because of symptoms. On the side of the prevention program, to the contrary, which consists in giving tuberculin tests to all contacts, to all who give suspicious histories, or who have suspicious physical signs, and to special groups, with X-ray studies of positive reactors, we have discovered 5 students during the same time with incipient disease who had not complained of illness. One of these, a medical student, who received the test and X-ray as a routine part of the examination required on admission, was found to have an advanced lesion with cavitation, yet had no symptoms, and no physical signs. We are therefore convinced that the greatest opportunity lies in discovering the disease *before* the occurrence of symptoms sufficient to bring the patient to the doctor.

TABLE I

INCIDENCE OF TUBERCULOSIS IN STUDENTS OF 21 COLLEGES AS REPORTED FROM 1932-1934

	<i>Number of Students Enrolled</i>	<i>Cases of Tuberculosis</i>	
		<i>Cases</i>	<i>Per Cent</i>
Men	78,356	459	0.58
Women	32,720	229	0.66
Total	111,076	688	0.62

INCIDENCE OF POSITIVE TUBERCULIN REACTIONS IN STUDENTS OF 48 COLLEGES AS REPORTED FROM 1932-34

	<i>Number of Students Tested</i>	<i>Positive</i>	<i>Per Cent</i>
Men	17,853+	5,888	33
Women	13,061+	3,050	22
Not Separated	7,237	3,044	..
Total	38,151	11,982	31

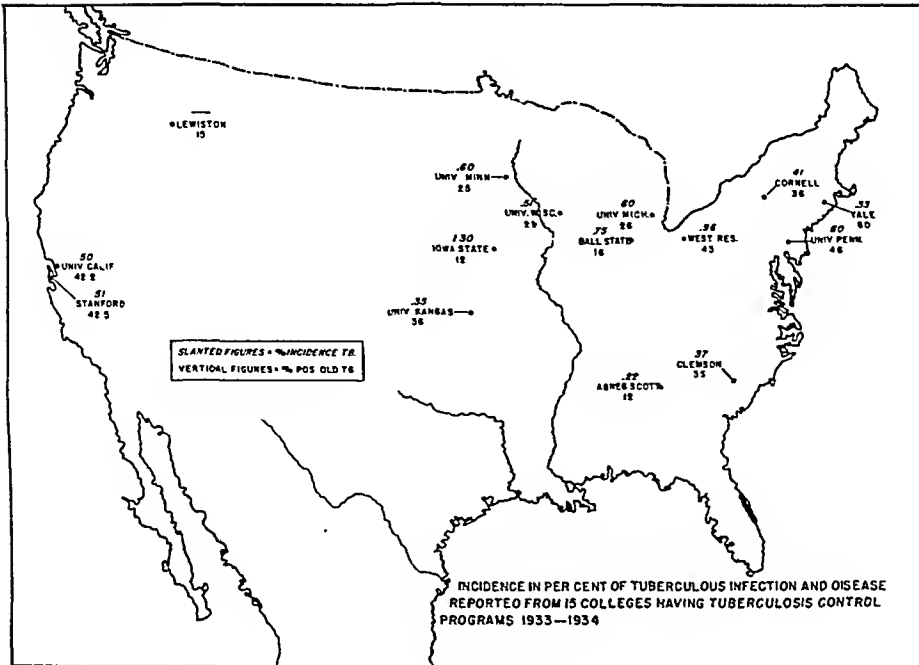
Student Health Service physicians from over 200 colleges in the country are members of a national organization known as the American Student Health Association. Three years ago this association set up a committee composed of Dr. Ferguson of Western Reserve University, Dr. Myers of the University of Minnesota, and the author to study the tuberculosis problem in colleges, and to inaugurate a campaign against the disease which would receive the unified support of members of the association. This committee, working under the advisory direction of Drs. Kleinschmidt, Long, Chadwick, and McPhedran, has had an unusual opportunity to promote and correlate a unified program of prevention against tuberculosis in colleges. College physicians have been encouraged to set up definite control programs with uniform attention to special history forms, physical examinations, including tuberculin testing, and X-ray studies of contacts and of special groups, and follow-up studies of suspicious cases by chest specialists. Many colleges have already adopted this program and are discovering cases which had previously escaped attention. Others have started modified programs made necessary by

limited resources and facilities, but are demonstrating the need for more intensive study.

In addition to its opportunity to promote the college campaign against tuberculosis, this national college project has broad research possibilities because it is under centralized control which will produce an increasing uniformity of procedure and relatively high reliability of results. Dr. Long has been the first to demonstrate its effectiveness as a research mechanism in a study on the use of purified protein derivative in college students. Among other research problems in this connection which are now being considered in various colleges are the following: The relation between positive and negative tuberculin reactors and the incidence of subsequent disease; incidence of disease by sex at the college level; effect of strenuous athletics on incidence; incidence in students in professional schools compared with general student groups; unification of methods of X-ray reports; studies of the relation between the presence of calcification and subsequent disease.

Many reports on these prevention and research programs are now coming in to the Committee on Tubercu-

CHART I



losis of the American Student Health Association, from which we present a few preliminary trends. These results are seen in Table I and Chart I. Progress to date indicates 10 times as many cases of tuberculosis reported from colleges where active control programs are being conducted than where little is being done about the problem. We find that the incidence of tuberculosis and of positive tuberculin reactors varies considerably in any given college from year to year and that some colleges seem consistently freer from disease and infection than others. The incidence of infection seems to be slightly higher in men than in women students, but the incidence of disease is slightly higher in women. The percentage of positive tuberculin reactors varies greatly in colleges located in different parts of the country. Thus, Iowa State College reported only 12 per cent reactors in almost 3,000 students tested in 1933 while Yale reported 62 per cent reactors in 3,000 students tested in 1932. The reports in general indicate that positive re-

actors are more frequent in colleges which draw students from more densely populated districts, such as the University of Pennsylvania and Yale University, than in colleges drawing chiefly from rural districts. (Dr. Halvorsen of the University of Idaho tells me that almost no students from the rural districts in Idaho react to tuberculin, while most of those from the mining districts in southern Idaho are positive reactors.)

From the combined reports of 48 colleges for the 2 years 1932-1934, representing a total of 33,151 students tested, the general average of positive reactors was found to be 31 per cent.

These are probably not as accurate as forthcoming reports will be, since there has not been complete uniformity in tuberculin used or in dosage. Most colleges have been using the Saranac tuberculin in 1/10 mg. doses. We are now recommending the use of P.P.D. in 2 doses, which should give us more reliable and comparable results. It is unfortunate that so few data are available either from people of college age

not attending college or from younger groups similarly distributed throughout the country. The closest comparison with data from younger groups comes from a National Tuberculosis Association study in which groups of children in various states are being tested with MA-100. Miss Jessamine Whitney has recently sent me a table summarizing the positive reactors found in 101 groups tested in 18 states. Twenty-five per cent of almost 3,000 children between 10 and 14 in this study reacted positively, and 27 per cent of 1,400 between 5 and 9 reacted positively. These percentages are almost the same as for college age groups, which is rather surprising in view of the high morbidity and mortality at 20-24 as compared with the 10-14 age group. These discrepancies may be due to difference in materials and dosages and to the wide local variation in numbers of reactors which are known to occur.

The incidence of disease reported from different colleges also varies greatly, probably depending largely upon the effectiveness of the local program and perhaps on geographical location, so that we are not justified in drawing conclusions from these reports. Agnes Scott College in Georgia reports only 1 girl with tuberculosis in 450 carefully studied, while Iowa State College (where tuberculin reactors are relatively few) reported 48 cases with an enrollment of almost 3,500 students, slightly over 1 in every 100 registered. From the combined reports of 21 colleges for the 2 years 1932-1934, representing over 110,000 students enrolled, 688 cases of tuberculosis were reported. This indicates a general average of 1 case in every 160 students enrolled, or a rough morbidity rate in these colleges of 625 per 100,000 for each year. Here again we have no comparable data on case finding studies on non-college age groups, so that we

do not know whether college students are more subject to the disease than other groups of young people. No comparisons can be made with morbidity rates in these age groups in states where tuberculosis is a notifiable disease, since reporting of cases is notoriously poor. It is also very probable that as case finding studies in colleges become more effective, more cases will be discovered. This will proceed to a fairly constant level which then would only be lowered finally as control measures became more effective in other parts of the general population.

It is quite certain that ideal campaigns against tuberculosis will not be reached in many colleges because of limitation of facilities. Such a program will be started at the University of California and Stanford University next year under the auspices of the San Francisco and Alameda County and California State Tuberculosis Associations. This program will comprise histories, physical examinations, and skin tests on 2,000 new students with X-ray studies of positive reactors, tuberculin tests repeated each year for those who reacted negatively the previous year, again followed by X-ray studies of the new reactors, this to be carried on through the 4 years of college and into graduate years of professional schools. Efforts will be made to contact students in this group over a 10 year period from next fall. In all suspicious cases there should be careful clinical follow-up. This study and follow-up procedure can be carried on with greater effectiveness in Student Health Services than among the general population because of the ease with which contacts can be made with student patients.

SUMMARY

During our span of life we each pass through certain periods when tuberculosis is to be specially feared. Tuber-

culosis is pertinently a problem of the ages from 15 to 44 as shown by a study of the death rates, and is especially to be feared in the years of late adolescence and early maturity—the college age. Realizing that people of college age are particularly susceptible to the disease and that disability in college students represents a peculiar economic loss, college administrators, through facilities for the care of student health, are concerned with the inauguration of control measures among college students. The American Student Health Association has accepted the challenge and by means of a central tuberculosis control committee has set up and recommended for adoption by colleges a program of case finding. During the 2 years in which this plan has been operating many colleges have reported progress while fairly complete surveys including histories, physical examinations, tuberculin testing, and

X-ray studies of positive reactors with follow-up of suspicious cases have been reported by some. A review of the progress of this work with the preliminary findings has here been reported. Results indicate that there is a considerable variation in case incidence in colleges in different parts of the country and that there is some variation by sex and age. It appears that almost 10 times as many cases have been found in colleges where control programs are being conducted than in colleges where no methods of early identification are being used. The value of the case finding surveys and attention to contacts and to suspicious cases in follow-up is here revealed. It is hoped that more thorough programs will soon be instituted in many colleges and that the results of such studies will lead the way toward similar methods of control in young adults in our industries and in our communities.

DISCUSSION

HAROLD G. TRIMBLE, M.D.

Oakland, Calif.

IF the Student Health Services of our universities are properly to safeguard the physical welfare of the students as well as to act as the practical health educator to our future community leaders, their tuberculosis problem must be handled in the fashion of today, not from the knowledge and methods of the past.

Those of us interested in tuberculosis are indeed remiss in having failed to get over even to the general medical public our modern thought of this problem. I refer to the necessity of tuberculin tests plus X-ray of the positive reactors. This well accepted procedure has certainly not been used by medical men in general in their daily work, and only in a relatively few University

Health Services. Tuberculosis is still the disease that kills the greatest number during the productive years of life. We preach early diagnosis for curability and yet 80 per cent of our cases are far advanced when first seen, and this percentage would be higher if we left out the primary pleural effusions.

We have progressed beyond the stage of treatment of the easily recognizable disease by virtue of symptoms and positive findings on routine physical examination. A study by Sampson and Brown¹ on 1,367 consecutive admissions shows the following with reference to their five diagnostic points.

The significant part of these figures to me is that 3 out of 10 of these cases of tuberculosis sent for sanatorium

Tubercle bacilli	61.5
Râles	68.5
X-ray	99. +
Hemoptysis	33.5
Pleurisy	12.0

treatment could not be diagnosed by the use of routine physical examination alone. This fits in with our own experience, and if we considered merely early lesions the difference would be far greater.

The matter of cost—particularly of X-ray film—is probably one of the most potent forces in preventing widespread use of the tuberculin plus X-ray studies of students. Budgets are not very flexible, especially when revised upwards.

For some years we have used, to our complete satisfaction, in private work, in clinic and hospital, fluoroscopic X-ray to separate positive from negative chests. This of course greatly reduces the costs. With the Patterson B. screen and a good tube and transformer, the technic is greatly simplified. The report of Fellows² was interesting to us in amply confirming these facts from quite a different point of view. I would commend the earnest study of his presentation to you. We have taught a number of younger men to handle the fluoroscope readily for this purpose and have just completed a fluoroscopic survey of 2,000 high school seniors using a portable fluoroscope. This worked very well.

I must tell of a talk just the other day with Dr. Walter M. Dickie, who for years was Secretary of the California State Board of Health. We were leaving a meeting of our local tuberculosis association when such a study of a university group was under discussion. He pointed out the analogy of this tuberculosis problem at this time to the story of the control of typhoid. It seems that by sanitation and isolation, the typhoid rate was brought down to a low level and there

it stuck without change until real effort and true epidemiological technic was brought to bear on the problem by tracing to its source each case when possible. A further marked drop then occurred down to our present level. The analogy seems complete.

If we will look on tuberculosis today as just such an epidemiologic problem and find out definitely by using tuberculin plus X-ray just where infection and disease lie in our college student bodies, we will not only be bringing to bear on this problem the best of modern weapons, but many individuals will be personally benefitted and a fine piece of health education accomplished.

College students are of the age group where we find the disease tuberculosis appearing. For at least 4 years their physical welfare is the responsibility of the Student Health Service. The tools are ready at hand, and tuberculin tests and some form of X-ray are simple in their application.

Let me close with a brief report from Dr. H. D. Lees, University of Pennsylvania. There the plan of X-raying all freshmen was found inadequate after several years' experience. All students are now examined routinely with the tuberculin test plus the X-ray. Of 15 cases examined because they applied for relief of symptoms, 12 were advanced cases of tuberculosis and obliged to leave school. Of 17 cases picked up by the routine tuberculin X-ray plan, all were symptomless and only 1 was dismissed from school.

Whether it be from the strictly scientific standpoint, from the economic or humanitarian, these facts alone would point to the necessity of incorporating these procedures in the routine of each Student Health Service.

REFERENCES

1. Sampson and Brown. *Am. J. Roentgenol.*, Feb., 1931.
2. Fellows. Value of the Fluoroscope in Pulmonary Tuberculosis Case Finding. *A.J.P.H.* 25, 2:109 (Feb.), 1935.

An Experimental Critique of the Allen Method of Evaluating the Bactericidal Action of Antiseptics

KEITH H. LEWIS AND LEO F. RETTGER

Department of Bacteriology, Yale University, New Haven, Conn.

THE status of bacteriological methods for determining the relative values of germicidal agents has been so far advanced during the past half century that many have come to feel that the ultimate solution of the problem lies, not in the field of bacteriology but, as Topley and Wilson have said, "in the domain of the physical chemist." This attitude is reflected in the relative scarcity in recent bacteriological literature of attempts to bring laboratory procedures into closer harmony with conditions encountered in the practical use of antiseptics and disinfectants. For even the phenol coefficient method advocated and employed by the U. S. Food and Drug Administration (Ruehle and Brewer, 1931) with all its good qualities of quantitative precision and controlled factors cannot pretend to approximate ordinary conditions of bacterial contamination and infection.

Among the few reports along this line which have appeared is the work of Allen (1929) and of Allen and Wright (1931). In the first of these papers a method is described in which the relative values of antiseptics are determined by the rapidity with which they appear to kill organisms on the surface of slant agar cultures. Results obtained by this method are given for tests made in duplicate with 21 antiseptics against 4 widely different

species of bacteria. The second paper is largely in the nature of a discussion of methods of determining the value of antiseptics; and it includes a brief review of Allen's original method, with certain modifications which are aimed at more accurate standardization of the technic. Unfortunately, no experimental data are included in this second paper to show the worth of these modifications.

On the ground that the surface of an agar slant culture more nearly resembles contaminated or infected tissue than does the liquid suspension used with the Food and Drug Administration method, Allen and Wright contend that data obtained by their procedure are of greater practical significance. Even the admission of Allen that his "method of determining the bactericidal values of antiseptics is open to criticism" has not called forth any published statement to support or refute the claims made for it. The aim of the present work was to examine this technic experimentally, with a view to determining what, if any, promise it holds as a practical method.

METHODS

The procedure which was first reported by Allen will be referred to in this paper as "Allen's Original Method," and the modified technic de-

scribed by Allen and Wright as "Allen's Modified Method." Parts of each paper are quoted.

Allen's Original Method—"The organisms used were a freshly isolated strain of *Staphylococcus aureus*, a similar strain of *Bacillus pyocyaneus*, and laboratory stock cultures of *Bacillus subtilis* and *Bacillus typhosus*. Preliminary to the actual experimental work, each culture was transplanted for 5 successive days on agar slants. Immediately preceding experimentation, 2 fresh transplants were made from the 5th daily culture to agar slants. These were labeled B and X, while the parent culture was labeled A. Culture X served as a control of growth; A was a 24 hour old culture, while B was a freshly inoculated slant. Twenty-one such groups were made up, using each of the 4 organisms employed.

"To each of the 21 A and B groups of the 4 cultures, a different antiseptic was added in such quantity that when the culture tube was held in the vertical position, the slant surface was entirely covered by the antiseptic solution, insuring continuous contact of the agar slant surface with its culture and the antiseptic. At intervals of 15, 30, 60, and 180 minutes, transplants were made from the A and B tubes to fresh agar slants A', A'', and B', B'', etc. A previously flamed platinum loop was inserted into the supernatant antiseptic fluid, down to the agar surface, where the loop was drawn across the agar slant surface with its bacterial covering. This loopful of suspension was withdrawn through the antiseptic fluid above and streaked on a fresh agar slant. These tubes plus the original were incubated at 37° C. for 24 hours and then observed. . . . The agar was the usual meat infusion agar titrated to a pH of 7.4."

Allen's Modified Method—"Organisms of known virility and resistance to phenol according to the classification of Reddish are used. They are transplanted for 3 successive days on agar slants of the following composition: Armour's peptone, 10 gm.; Liebig's beef extract, 5 gm.; salt, 5 gm.; agar, 15 gm.; distilled water, 1,000 c.c., adjusted to a pH of 6.8. Five c.c. of the agar is placed in each of the usual 5/8" by 5 7/8" lipped test tubes and autoclaved at 20 lb. pressure for 1/2 hour. Immediately on removal from the sterilizer the tubes are set at an angle of about 15° to the horizon to insure as nearly as possible even and equal slant surfaces, and also to prevent the formation of the undesirable water of condensation which re-

sults from the usual remelting and recooling method of preparing the slants.

"From the 3rd successive culture a fresh sub-culture (known as A) of each organism to be used, is made as follows: With a straight nichrome needle, a smear, or at least three streaks, are made on a fresh agar slant (A). This is incubated at 37.5° C. for 24 hours. At the expiration of this time, 10 c.c. of the antiseptic to be tested is added to the culture (A). This should be adequate to cover the slant completely when in an upright position. The antiseptic is added at a temperature of 37.5° C. Thenceforth the cultures are maintained at the same temperature by means of a water bath. At intervals of 5, 10, 15, 30, and 60 minutes, transplants from the cultures (A) are made on fresh agar slants (B) or Petri dishes (medium as previously described) as follows: With a straight nichrome needle a transplant is removed from the surface of the agar slant (A) and at least 3 streaks made on the fresh agar (B). This (B) is incubated at 37.5° C. for 48 hours and then read."

"Subcultures (C) are made from all transplants (B) in which there is doubt as to the presence of growth of the organisms."

Present Methods—With the few limitations noted below, the general methods employed in this work are those already quoted. Experimental modifications will be mentioned in discussing the data.

Staphylococcus aureus (Reddish strain), *Pseudomonas aeruginosa* (N. Y. U. strain) and *Eberthella typhi* (Hopkins strain) were used throughout as the test organisms. When tested according to the U. S. Food and Drug Administration method of determining Phenol Coefficients at 20° C. they resisted phenol concentrations of 1:70, 1:80 and 1:90, respectively, for 5, but not for 10 minutes. *Bacillus subtilis* was not employed, because it is a spore-forming organism and, therefore, offers serious difficulties in experiments of this kind.

Ten of the 21 antiseptics reported by Allen in 1929 were used. They are listed in Table I, 6 under their customary names, and 4 by numbers.

It was impossible, of course, to know

TABLE I

<i>Antiseptics</i>	<i>Concentration</i>
Phenol	1:1000, 1:100, 1:50
Ethyl alcohol	1:1.25 (80 per cent)
Mercuric chloride	1:1000
Dichloramine T	1:20 (soluble portion)
Hydrogen peroxide	Market product; full strength
Tincture of iodine	U. S. P., full strength
Solution No. 7	} Well known trade products
Solution No. 8	
Solution No. 9	
Solution No. 10	

the composition of the "usual meat infusion agar" used in Allen's Original Method. We employed the standard beef infusion agar, which contained the fresh extract of 500 gm. of lean beef per 1,000 c.c. medium, 5 gm. of Bacto-peptone (0.5 per cent), 5 gm. of sodium chloride (0.5 per cent), and 15 gm. of Difco-agar (1.5 per cent). The pH was adjusted to 7.4-7.6 before the addition of the agar.

In all experiments other than those dealing with Allen's Original Method the medium recommended in Allen's Modified Method was employed.

EXPERIMENTAL

TESTS MADE ACCORDING TO ALLEN'S ORIGINAL AND MODIFIED METHODS

In order to determine what degree of accuracy may be expected from both the original and the modified method of Allen, three series of tests were conducted using both of these procedures. The technics described by Allen were adhered to. Where the published directions lacked completeness, the points in question were elucidated in a personal communication from Dr. Allen. Perhaps it should also be emphasized here that these experiments had, as their real purpose, evaluation of the methods, rather than of antiseptics.

Because the data collected are of such volume as to forbid publication, even in tabulated form, the results are presented here in more or less condensed, commentary form.

1. Considering each culture tube subjected to medication as the unit

test, it was found that 20, or about 9 per cent, of the 216 tests made according to the original method showed irregularities or skips (negative sub-cultures followed by positive sub-cultures at a later time interval) within themselves. Eight skips (8 per cent) occurred in the 97 tests made according to the modified method. While these numbers are not in themselves of sufficient magnitude to constitute a very serious fault, a study of specific instances shows that the nature of these irregularities is particularly annoying and undesirable. For example, the 24-hour culture of *Ps. aeruginosa* exposed to phenol (1:100) in a test made according to the original method, showed no growth in transplants made at intervals of 30 and 60 minutes of exposure, while after 15 and 180 minutes growth did occur. An illustration of a similar situation occurring in tests made according to the modified method is to be seen in the case of a 24 hour old culture of *Staph. aureus* which was subjected to ethyl alcohol (1:1.25). Transplants made at intervals of 5, 10, 15, and 30 minutes after medication showed no growth, but at the end of 60 minutes the organism was recovered. In these cases, as with all questionable results, further sub-cultures were made, to determine the presence or absence of the original test organism. Almost any one of the other tests in which skips occurred could be used to illustrate this defect which, as will be shown later, is largely inherent in the method.

2. A comparison of the three series of tests with each antiseptic made according to both technics showed that complete agreement of results was obtained only when no growth occurred in sub-cultures at any of the four time intervals, or when it occurred in all. In other words, when complete killing or marked reduction in the number of living cells took place between the time

of the first and last transfers, the results varied so widely that it was impossible to assign any definite values to the antiseptics. Obviously, this type of discrepancy imposes serious limitations on the test; for, if it is not reproducible little can be gained by its use. The fact that the series of tests with the Original Method were carried out at room temperature (22–25° C.) in accordance with Allen's directions (personal communication) has perhaps contributed to these variations. However, it should be stated that tests with the modified method in which the temperature was held constant were not free from this error.

3. The data obtained by us are by no means in accord with those presented by Allen for supposedly similar tests. While the much overworked "personal equation" may be a factor, it is impossible to explain all of the differences between his and our own results on this basis. In our work, 0.1 per cent phenol showed no killing action on any of the test organisms when they were exposed for 3 hours at room temperature, and on one occasion viable organisms were recovered even after 24 hours of exposure. Allen reported, however, one set of data in which he did not recover viable *Staph. aureus* or *Ps. aeruginosa* after exposure of more than 1 hour, and *E. typhi* after an interval longer than 30 minutes, when 24 hour old cultures of each were exposed to this concentration of phenol. Granting that his results were obtained with different strains of bacteria from those used here, it scarcely seems compatible with common knowledge of the properties of these organisms to assume that any authentic strains should show such extreme susceptibility. Since no certain explanation presents itself, this point must be accepted simply as further evidence of the unreliability of the method.

Although Allen's Modified Method

appears somewhat more satisfactory than his Original Method, it too exhibits the same fundamental defects of irregularity and lack of reproducibility. Consequently, the criticism presented above may be considered to apply equally to both technics.

A CONCEALED FACTOR RESPONSIBLE FOR SOME OF THE DISCREPANCIES

Having tried unsuccessfully to show that the lack of uniformity in results could be attributed to variations in temperature, failure to distinguish between growth and debris carried over from medicated cultures to sub-cultures, mechanical variations in making transfers, and a number of other possible factors, it was thought that perhaps the medicated agar slant cultures themselves were responsible for the lack of uniformity.

To test this possibility duplicate infusion agar slope cultures evenly covered with the 3 test organisms were subjected to 2 per cent phenol at 20° C. Transfers were made according to Allen's Original Method, except that at each time interval 2 sub-cultures were inoculated from each medicated culture instead of 1. The inoculum for the first was taken from the upper half, but not the extreme tip, of the slant, and for the 2nd from the lower half near the base of the sloped surface. When these pairs of sub-cultures were observed after 24 hours incubation at 37° C., and rechecked after a 2nd day of incubation, the results recorded in Table II were obtained. When sub-cultures were inoculated with material taken from the upper parts of the medicated slopes of *Staph. aureus*, *Ps. aeruginosa* and *E. typhi*, the only transfers in which growth occurred were those made from 24 hour cultures of *Staph. aureus* at the first time interval (15 min.). In sharp contrast to these results, the transfers made from the lower portions of the same medi-

TABLE II

VIABILITY OF INOCULA TAKEN FROM UPPER AND LOWER PORTIONS OF SLANT CULTURES
MEDICATED WITH 2 PER CENT PHENOL

Test Organism	Tube No.	Portion of slant from which inoculum for sub-cultures was taken	Hours of Incubation Before Exposure to Phenol								C
			24				0				
			Expos. in Min.				Expos. in Min.				
			15	30	60	180	15	30	60	180	
<i>Staphylococcus aureus</i>	1	Upper	+	—	—	—	—	—	—	—	+
		Lower	+	+	+	+	+	+	+	+	+
	2	Upper	+	—	—	—	—	—	—	—	+
		Lower	+	+	+	+	+	+	+	+	+
<i>Pseudomonas aeruginosa</i>	1	Upper	—	—	—	—	—	—	—	—	+
		Lower	+	+	+	+	—	—	—	—	+
	2	Upper	—	—	—	—	—	—	—	—	+
		Lower	+	—	+	+	+	+	+	+	+
<i>Eberthella typhi</i>	1	Upper	—	—	—	—	—	—	—	—	+
		Lower	+	+	+	+	—	+	—	—	+
	2	Upper	—	—	—	—	—	—	—	—	+
		Lower	+	+	+	+	+	+	+	+	+

Legend: + = Growth
 — = No growth
 C = Control

general agreement of these experiments

Legend: + = Growth
— = No growth
C = Control

cated 24 hour old cultures showed growth even after 3 hours of exposure. The fact that the freshly inoculated slants showed a similar trend would seem to indicate that probably some external physical factor, rather than any actual difference in resistance of the organisms, is responsible for these results.

For the sake of brevity, only the limited data presented above can be included here, but care was taken to extend the investigation of this point to repeated tests with Allen's Original Method and Allen's Modified Method, and with the use of 8 antiseptics, in addition to phenol. The more or less

general agreement of these experiments in showing a marked difference in length of time required to kill the organisms on the upper half of an agar slant as compared with that required to destroy those at the base of the same slant can leave little doubt about this physical factor being of general importance in interpreting the faulty results obtained by Allen's technic. Since his directions make no restrictions as to what portion of the slant the inoculum should be taken from, the operator is at liberty to pick indiscriminately from the upper or lower portions. If by choice or by chance he takes the inoculum from the lower part at the first and last time intervals, and from the upper portion at the end of

the intermediate periods, he will be very apt to observe growth only in the first and last sub-cultures. Should he repeat the same test, it is quite probable that he would not transfer from the same areas at the same time intervals, and would thereby get a set of results which differ from the first set. Also, a technician knowing this trick could, within limits, vary the results to suit his fancy.

While the above comments do not entirely explain the difficulties encountered, the point stressed appears to us to constitute a sufficiently serious objection to Allen's technics to lay data obtained with them open to serious question.

A FURTHER MODIFICATION OF ALLEN'S METHOD

The central idea upon which Allen's method is based is that the bactericidal action of antiseptics upon organisms matted on the surface of an agar medium more closely resembles the ability of these agents to destroy bacteria in contact with the animal body than does the action exerted against the naked suspensions of organisms used in the standard Food and Drug Administration method. Although an agar gel can scarcely be considered as an adequate substitute for living tissue, this effort is certainly a move in the right direction.

Having demonstrated that the procedures recommended by Allen do not give satisfactory results, an attempt was made to incorporate the agar culture idea into a test sufficiently simple and accurate to make it practical. To this end a variety of experimental modifications was employed. Because most of these were found to be without any real merit, they are not included in this report. However, from the experience gained in these investigations, it was possible to evolve a modification which shows some promise

and appears to be no more faulty than some of the present accepted technics. A description of this procedure is given here.

Tubes containing 5 c.c. of the agar recommended in Allen's Modified Method are prepared and, after sterilization, are allowed to solidify in an upright position so that the flat surface of the medium is at right angles to the walls of the tube. These tubes are inoculated with 0.1 c.c. of a 24 hour-old broth culture of the desired test organism, which had been transferred serially on the 5 preceding days through broth of the same composition as the agar medium before the agar is added. The inoculum must be spread evenly over the surface of the medium. The agar tubes are incubated for 24 hours at 37.5° C. Ten c.c. of the germicidal agent to be tested are then introduced into the culture tubes by allowing the liquid to run down the side of the tube in such a way as not to disturb the bacterial growth on the surface of the agar. The medicated cultures are held in a water bath at the desired constant temperature (37.5° C., in our tests). At given periods of time (usually 5 minute intervals) transfers are made to 10 c.c. of sterile broth by means of a 4 mm. nichrome loop which is so bent that a 90° angle is formed at the juncture of the loop and the straight wire shaft. The flamed and cooled loop is passed through the germicidal solution to the surface of the agar without penetrating the medium. Sufficient bacterial growth to be easily visible is gently scraped from the surface onto the needle, which is then carefully withdrawn and the inoculum deposited in the receiving broth. The broth tubes are incubated for 48 hours at 37.5° C., and subjected to careful observation for evidence of growth.

Table III may serve to illustrate what may be expected of this procedure.

TABLE III

RESULTS OBTAINED BY A FURTHER MODIFICATION OF ALLEN'S METHOD, USING
1:80 AQUEOUS PHENOL

Minutes of Exposure

Test	Staph. aureus						Ps. aeruginosa						E. typhi						Controls on growth (even test no.) and sterility (odd test no.)					
	5	10	15	20	30	60	5	10	15	20	30	60	5	10	15	20	30	60	5	10	15	20	30	60
1	+	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
2	+	+	+	+	+	+	+	-	-	-	-	-	+	+	-	-	-	-	+	+	+	+	+	+
3	+	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-
4	+	+	+	+	+	+	+	-	-	-	-	-	+	-	-	-	-	-	+	+	+	+	+	+
5	+	+	+	+	+	+	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	+	+	+	+	+	+	+	+	-	-	-	-	+	+	-	-	-	-	+	+	+	+	+	+

Legend: + = Growth - = No growth

SUMMARY

Repetition of the procedures recommended by Allen in 1929, and Allen and Wright in 1931, for evaluating antiseptics has shown that because of skips and lack of repeatability these methods are unreliable. A major portion of the faults of these technics may be attributed to the fact that organisms on the lower portion of a medicated agar slope are less readily killed than those on the upper portion.

Although the results presented here indicate that little significance may be attached to the two methods of Allen, and to his reported data, they do not necessarily imply that the principle of determining bactericidal action of substances upon organisms growing on an agar surface lacks merit. The presentation here of a further modification of the agar culture technic is based on limited observations. It does, however, appear to obviate some of the difficulties of Allen's methods.

BIBLIOGRAPHY

- Allen, A. W. *Arch. Surg.*, 19:512-517, 1929.
 Allen, A. W., and Wright, I. S. *J.A.M.A.*, 96: 920-925, 1931.
 Ruehle, G. L. A., and Brewer, C. M. United States Food and Drug Administration Methods of Testing Antiseptics and Disinfectants. *U.S.D.A. Circular No. 198*, 1931.
 Topley, W. W. C., and Wilson, G. S. *The Principles of Bacteriology and Immunity*. Vol. 1, 1929, p. 89.

in the way of constancy of results when the technic is carefully carried out. These data have been obtained by subjecting 6 cultures each of *Staph. aureus*, *Ps. aeruginosa* and *E. typhi* to 1:80 aqueous phenol. The 3 control tests in which no growth occurred represent sterile agar tubes subjected to phenol, while the 3 controls showing growth are cultures of *Staph. aureus* subjected to 10 c.c. of sterile water. From these results it will be seen that no skips occurred in any of the tests and that, while the killing time in each of the 6 series of tests was not identical, in no case did it vary by more than one 5 minute interval from the average.

Considerable doubt is felt as to the advisability of presenting the above modified procedure, because the work done on this phase of the problem has been quite limited. Nor is it our intention to present this procedure as a substitute for, or supplement to, the generally accepted Food and Drug Administration Method. We believe, however, that it may be of scientific interest, and that in its present or further modified form, it may be of some value in the evaluation of antiseptics under more nearly practical conditions than most methods have admitted.

Relative Toxicological Effects of Synthetic Ethanol and Grain Fermentation Ethanol in Blended Whiskies

C. W. MUEHLBERGER, PH.D.

Department of Toxicology, Northwestern University Medical School, Chicago, Ill.

SINCE the repeal of the 18th Amendment to the Constitution and the legalizing of the use of alcoholic liquors, the question of blended whiskey has again aroused interest. Prior to the advent of prohibition, the alcohol used in the preparation of blended whiskies was produced largely through the fermentation of grain-mash. Smaller amounts were produced by the fermentation of blackstrap molasses. Today, the most economical source of fermentation alcohol is probably molasses. The synthesis of ethyl alcohol from ethylene has been known to organic chemists for a long time, but this process has only quite recently been developed on a technical scale of production, utilizing the gases resulting from the "cracking" of petroleum. The ethylene from this source is combined with sulphuric acid to form ethyl sulphuric acid. This, in turn, is hydrolized with alkali to produce ethyl alcohol. This synthetic alcohol is now obtainable in large quantities in a very high degree of purity, at prices which compare quite favorably with fermentation alcohol.

These studies were undertaken to determine whether there was any detectable difference in the intoxicating or toxic properties of alcohol produced by grain fermentation and that synthesized from hydrocarbons, and,

furthermore, to compare their effects when used in blending whiskies.

TESTS OF COMPARATIVE EFFECTS OF SYNTHETIC AND FERMENTATION ALCOHOL

The samples of alcohol employed were purchased on the open market and were found to correspond to the requirements of the United States Pharmacopoeia. The fermentation alcohol was stated by the manufacturer to have been prepared from grain. It contained 94.94 per cent ethyl alcohol and 5.06 per cent water, by volume. The synthetic product contained 95 per cent ethyl alcohol and 5 per cent water, by volume. When the U.S.P. tests were applied, both specimens gave negative reactions for fusel oil constituents, acetone, methanol, and aldehyde. It can be stated from the chemical tests that these were both samples of the constant boiling mixture of ethanol and water, which constitutes the common 95 per cent alcohol employed in pharmacy.

Animal experiments on alcohol from these two sources have been conducted in other laboratories and will be reported elsewhere. The tests reported herein were made entirely upon humans. Fifteen male subjects were employed. They ranged from 22 to 51 years of age. Of these, 6 were medical students,

4 were engaged in light labor, and 5 in heavy labor. They were classified on the basis of previous experience with intoxicating liquors, as (1) abstainers, (2) moderate drinkers, and (3) heavy drinkers. Subjects were required to abstain from all alcoholic beverages during the 48 hours preceding the test, and to report early in the morning without having eaten breakfast.

The dose of alcohol was gauged according to the weight of the subject and the reported previous experience with alcohol. Abstainers were given 0.5 c.c. absolute alcohol per kg. body weight, moderate drinkers received 1.0 c.c. per kg., and heavy drinkers received 1.5 c.c. per kg. In each case, the alcohol was diluted to 10 per cent strength with cool water. The subject was required to drink one-tenth of this diluted dose during each 3 minutes over a 30 minute interval.

Two tests were conducted upon each subject—one employing diluted fermentation alcohol and the other using synthetic alcohol. The bladder was emptied at the start of the experiment to furnish a control specimen of urine. Urine specimens were collected at 45, 90, 120, 180, and 240 minutes after completely drinking the alcohol dose. Subjective symptoms, as well as objective observations of alcoholic intoxication or any of the accompanying complicating factors such as nausea, headache, etc., were noted during the period following the drinking.

On the doses employed, the subjects reached varying stages of intoxication, ranging from a feeling of fullness in the head to a drunken stupor. The peak of the objective response, as well as the maximum concentration of alcohol in the urine, was reached at about 45 minutes after completion of the drinking. The average maximum concentrations of alcohol of the urine were 0.9 mg. per c.c. for the group of abstainers, 1.25 mg. per c.c. for the group

of moderate drinkers, and 1.65 mg. per c.c. for the group of heavy drinkers. In duplicate experiments, no real difference could be observed between the response to ethanol from the two sources (grain fermentation and synthetic).

EXPERIMENTS ON THE EFFECTS OF 4
YEAR OLD KENTUCKY BOURBON
WHISKY BLENDED WITH 50
PER CENT ALCOHOL

Specimens of Kentucky Bourbon whisky (aged 4 years) were blended by expert blenders using in one instance 50 per cent grain fermentation alcohol and in the other instance synthetic alcohol. The blended products were adjusted to a final alcohol content at 50 per cent by volume (100 proof). So far as fusel oil content, aldehydes, esters, and acidity were concerned, the content of both blended whiskies were much lower than the straight bourbon whiskey which was used. The analyses of the two blended whiskies were essentially the same.

Employing the same 15 human subjects used in the alcohol tests, similar experiments were conducted using these two blended whiskies. In calculating the dose for each individual subject, the amount of whiskey necessary to give a maximum urine concentration of 1.5 mg. alcohol per c.c. was estimated. In this way an attempt was made to rule out individual susceptibility to alcohol and to make all the subjects equally intoxicated. Based upon previous experience in the alcohol tests, this result was fairly well approximated. The various subjects all became quite intoxicated, although they varied materially in the manner in which this intoxication became manifest. Some became drowsy and fell asleep; others became sullen and morose; others were emotionally excited with fits of hilarity, singing, weeping or combativeness. Observations were made to note any differences between the two whisky

blends in each of the subjects—not only with respect to the acute effects but also for any material differences in the chronic effects ("hangover") such as headache, nausea, etc. So far as could be determined, the effects of the two blended whiskies were identical.

SUMMARY

The effects of drinking diluted ethyl alcohol from two sources, (1) grain fermentation, and (2) synthesis from ethylene, have been studied in 15

human subjects. Alcohol from these two sources blended with 50 per cent of 4 year old Kentucky Bourbon whiskey to give 100 proof blends, have been studied in same series of subjects. No difference in intoxicating effect nor in immediate after-effects ("hangover") could be noted in the effects of the alcohols nor in the whisky blends prepared from them. In their effect upon the human, synthetic ethyl alcohol is identical with ethyl alcohol produced from the fermentation of grain.

What Is Public Health?

IS not public health merely a matter of water supplies, ventilation, sewage, clinics, drains, street cleaning, garbage, infectious diseases, public health nurses, flies, dirt, slums, and serums? True it is that these items are all in it. But they no more constitute public health than mere paint, canvas, and brushes constitute art; or mere iron ore and smelters constitute architecture; or rods, lines, and nets constitute the fishing industry; or axes and wire rope constitute lumbering; or schoolhouses and textbooks constitute education. All these items are merely the tools of the arts. The tools of an art are essential to the art; but they do not constitute the art. Art is the result achieved; it is that object toward which tools merely perform the shaping of the path. . . .

That public health originated in the attempt to relieve crude physical suffering and especially to achieve this only by preventing disease, does not take

from its present or future immensely greater importance. That it has reached already its present outstanding influence is proof enough of its inherent strength, a strength derived wholly from its truth—that is, its correspondence with, not things just dreamed about, but things that are—not with just some things in the universe but with all things. . . .

The common objective of medicine and of public health is the reduction of human misery due to disease and death. The one devoted itself to the relief and cure of those already suffering, the other to prevention. Since neither fully succeeds, each must continue to supplement the other. Each in its own field has made enormous advances from each its own angle. Coöperation is increasing as each—medicine and public health—understands the other's problems better.—H. W. Hill, M.D., *Weekly Bull.*, Albany, N. Y., Aug. 8, 1935.

The Aims of School Health Service*

DON W. GUDAKUNST, M.D., F.A.P.H.A.

Director of School Health Service, Detroit Department of Health, Detroit, Mich.

THE aim of a health service in school is obviously to make for a healthier group of children. The effort, which has been carried on through the device of doing things for children, has not been sufficiently successful. It has not been as successful as the magnitude of expenditure of thought, time and money would warrant. The traditional procedure calls for the assumption of great responsibility on the part of the school staff for the health practices of the children. The school has assumed responsibility for the control of communicable diseases, for the detection and correction of physical defects of the children. When there has been danger of diphtheria or smallpox the school vaccinated and immunized the children. The cases of communicable diseases occurring in the group have been detected, diagnosed and excluded by the school staff of teachers, nurses and physicians. Physical defects have been detected and, at times and under certain conditions, corrective work has been carried out, or at least started.

The question has now been raised as to the necessity and the advisability of carrying on the same procedures year after year in the same manner. Today in most places the same kinds and numbers of physical defects are found by the same kind of physical examinations as thirty years ago. Studies made in New York, Detroit and else-

where show that only about 2 per cent of the serious physical defects discovered by the medical examiners in school are brought to correction within the year, in spite of the abundance of clinical medical services in these communities. There are 80 to 90 per cent of school children needing dental care, in spite of all the school dental clinics that have been operated. Each year in many schools it is necessary to vaccinate and immunize against diphtheria the same percentage of children as in the past in order to bring the protection level up only to a point where the health authorities hope that there will not be an epidemic, or that there will not be deaths from these diseases.

These questions are being asked not for the first time, but more insistently than ever before. An answer is more important in these days of readjustment than in the days of expansion.

A child presenting himself at school with an uncared for physical defect, or without the common, accepted, protective immunizations represents not what was once thought, but very likely an entirely different problem. The question is not one of a particular child being neglected. It is not a problem for which an answer is secured by having a physical defect corrected or immunization done. It is not as simple as that—for if it were it is only reasonable to assume that there would, at least in certain parts of the country, have been some signs of a permanent solution to the problem. Defects have

* To be read at the meeting of the American Association of School Physicians in Milwaukee, Wis., October 9, 1935.

been corrected—and yet our problem is as great as ever. We cannot measure the success of any school health service program by the number of defects corrected or the number of children immunized by the school. These things rather measure the failures of the community health program. Why should any parent or any community allow such conditions to go on year after year? Why should parents wait until the most susceptible age period for diphtheria has passed before administering toxoid? Why should a health department allow a full fifth of its entire population and its most susceptible age group (the preschool group) to go unvaccinated? Is it good medical practice to allow such physical conditions as progressive myopia, congenital syphilis, rheumatic heart lesions, focal infections of teeth and tonsils, and similar other progressive conditions to go on year after year without active and continuous medical treatment? Yet are not these the very conditions that we find in our schools? If the traditional school health service has not directly contributed to this state it has at least been of little avail in correcting it.

There is another thought that serves as a challenge to school physicians. Let us consider the group that has left our schools and attempt to analyze its thinking in respect to medical services. The high school student has for 12 or more years been given certain medical services. In most places, rural and urban, he was vaccinated by the school doctor, he was given toxin-antitoxin or toxoid, Schick tested, given a Dick test or Dick toxin. Each year, or at least every 3 years, in the more progressive schools he was given a physical examination, and recommendations were made to him and his family as to what should be done about the defects found. He was protected against exposure to communicable diseases

through the action of the school staff. In other words for more than a decade of life the school child is taken as a ward of the state in respect to medical care. He is taught to turn to and depend upon the school teacher, nurse, and physician for all his essential medical advice and even service. Not only is he taught to depend upon this staff for the things that need to be done, but he is taught to lean upon them for knowledge and information as to whether anything needs to be done. All health factors of the school child, both those that are a credit to the child and those that are considered detrimental, are motivated by, detected and appraised by the school. The child has little opportunity to play anything but a most passive part. As a result of this sort of education we cannot expect to find a high school graduate well trained in that phase of good citizenship that has to do with the preservation of health. Upon leaving our schools there is no one upon whom he can lean. There is no longer a school doctor and nurse to tell him that he is right or wrong. During these years in schools there has been little or no attempt to point the way he should go after leaving. This point is not lost sight of in the more traditional parts of the school curriculum. Health education when carried out under that name attempts to do the thing that is desired, but the service side of the program almost always directly violates the teachings of the educators and children are not taught how to care for themselves. It has never been demonstrated that there is any educational carry-over value to doing a thing for a child. He must learn how to do it himself. This is accepted by all educators. Yet we have attempted the educationally impossible in health. We have tried to teach our school children to be good citizens, to care for themselves, to help preserve the health of

the nation, and the race, through the process of having all the things that have been mentioned done for him. We have done our best to teach the public the very opposite from that which seems to be most desired—continuous medical services intelligently sought and capably administered.

When a child enters school with a physical defect which has not been, but should be, corrected there is a real problem presented to the school health authorities. Here is a challenge to the educational forces of the community. This child represents a problem in either individual or community health education, or possibly both. The mere detection or correction of the defect does not alter the fundamental condition that allowed for the persistence of an uncorrected defect. The problem, if individual, may be one of education of that child's family. It is usually found that the parents are lacking in appreciation of the need of medical care, or having this they are lacking in the knowledge of how to secure the care that they know to be needed for the child. Either one or both of these may be present—and either one or both should receive the attention of the school health authorities. The correction of these lacks of knowledge automatically takes care of the correction of the defect in the child. But the effects are more far-reaching than this immediate objective. Having learned the need, the advantages, and the method of securing medical care for one member of the family for a particular reason it is not too much to expect this lesson will have a carry-over value and in the future the health of the entire family unit will be better cared for in other respects.

At times the fault does not lie with the individual family. It must be admitted that under certain conditions the family may have a proper appreciation of a continuous medical service but be

totally unable to secure such care for purely financial reasons. Then the fault is one of community health education. Those school health authorities who busy themselves only with the particular child, and his isolated defect, follow a very short-sighted policy. They miss the bigger opportunity. Every effort must be used to awaken the civic leaders to their responsibility. The school is an admirable situation to elicit and direct public action to care for the well-being of the entire population. The civic and medical leaders should have pointed out to them the fact that there are not sufficient medical facilities available for all classes of people. Under proper stimulation and guidance the community then will go a long way in correcting this fault of community health education.

Here then, we have our problem. The school health service program of the past has not been an effective device for the education of either the particular child or of the community as a whole. Year after year the school has been presented with the same old problems and has had new ones added as time went on. People have not been taught to use their own initiative in securing either corrective or prophylactic medical care. They have not become acquainted with the medical facilities and practices of the present day, nor have they learned the method of using them to the best advantage.

This problem is one of education. It calls not so much for new forces and new efforts but rather for a re-direction of the old efforts and a new thinking. The examination of the school child no longer needs to be a fact-finding device. The experiences of the past third of a century of school medical work afford sufficient evidence to prognosticate the percentages of defects in almost any age group. It is better that the examination be used as a personal demonstration to the child's own par-

ents of the need of medical care. The school physician, having demonstrated the need of care, can then point out to the parents at the same time the means of obtaining that care. This means will vary with the individual child and the particular community and its facilities.

Further than this, when the health forces of the community fully appreciate the health problems of the school child as they exist today and when the community learns to meet the problems, then there will be need for less and not more medical work in schools. When the parents of school children have learned the advantages and means of giving continuous medical supervision to their children during the periods of infancy and preschool life, when children enter school protected against communicable diseases, with defects corrected or prevented, with health habits properly directed, then the school physician will have a different rôle to play—that of the educator alone.

But the education of the parents is not sufficient. The medical forces of the community must also be stimulated. The entire blame for the appalling findings recorded by any school physician cannot be laid solely at the door of the parents. Too frequently the medical profession itself has been indifferent to the problem and has assumed that all the necessary things would be cared for when the child entered or was about to enter school. Not only must the parents be brought to the school to have a demonstration of the need for medical supervision of children's health but so, too, must the physicians. What then is more logical than to have the practising medical fraternity make the examinations, conduct the demonstrations and give the education relative to the methods of securing the indicated care. If each physician practising in a community could serve as a school phy-

sician it is only reasonable that with proper guidance and supervision he would then translate his school experiences in terms of his own practice. The schools then would serve not only the parents, but also the physicians.

In order to gain these ends and in following out these ideas Detroit during the past 12 years has radically departed from the practices of most other communities. Diphtheria immunization has been discontinued as a school problem. For 7 years none of this work has been done in school. The time, efforts and money that would otherwise be spent on this have been directed towards teaching the people to go to their personal physicians for this service at the time of life when the child is most in need. As a result no school has less than 65 per cent of the children protected before they enter the kindergarten.

No school physician serves on the health service staff for a period greater than 2 years. During this time each is given an insight into the services that the schools expect to have performed for the children long before they enter. Instead of a small staff of full-time physicians doing the necessary work, as many as possible are employed through the system of decreasing the hours each serves.

Another departure from the usual is in the matter of physical examinations before or shortly after entering school. Each school nurse and all other public health nurses carry and distribute examination blanks to all parents with whom they come in contact during the year. If the child is of school age, or shortly is to enter school, the parents are instructed to return the blank to the school. But always it is impressed upon the parents that this is a responsibility of theirs—it is they who must see to it that the child has a periodic health examination. This same examination blank is used for all grades

and all age levels. Two out of 3 of all the physicians of the city filled out such blanks during the past school year.

There has been an attempt to set up a system that will direct the attention of the child and the community away from the school in matters pertaining to health service. An effort is being made to have all possible protective services rendered during the earliest periods of life before the school age.

People are being taught to turn to their own physicians for health guidance for all age levels. School children are being guided and trained in health practices that will not of necessity end with the formal school period. The coöperation of the practising physicians in this move is obtained for it is they who actually do the work. The plan is feasible and workable, and it is giving the desired results—not only a healthier school child, but a healthier community.

On Immunisation

LASTLY, one final word on immunisation. Personally I find it difficult to believe that active immunisation of the population against every conceivable infection is the last word in prevention of infectious disease, but at the moment we must admit that so far as these personal infections are concerned, it is by far the most potent preventive we possess, and it would be foolish not to make full use of it in appropriate circumstances. Most people are prepared to give the method a fair trial if its purpose is clearly explained to them and the element of compulsion is eliminated. Apart from vaccination against smallpox, which remains the only really effective means at our disposal for combating this disease, one of the most important recent additions to our armamentarium is diphtheria prophylaxis. To anyone contemplating a trial of this method I would emphasise the importance (1) of educating

the parents and particularly the mothers as regards its advantages; (2) of enlisting the support of the local medical profession, and in this connection I would refer to the valuable report recently prepared by a committee of the British Medical Association under the chairmanship of Professor Picken, in which the whole question is carefully reviewed; and (3) of concentrating on the younger ages. The age of maximum incidence of diphtheria is six to eight years, and American experience suggests that at least thirty per cent to forty per cent of the children below this age must be immunised to ensure against a serious outbreak.—Presidential Address on Some Aspects of the Problem of the Prevention and Control of Infectious Disease, by Thomas Carnwath, D.S.O., M.B., D.Sc., D.P.H., Deputy Chief Medical Officer, Ministry of Health, *J. Roy. San. Inst.*, Sept., 1935, pp. 94–95.

EDITORIAL SECTION

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WHAT SHALL WE THINK OF SOCIAL SECURITY?

NOW that the tumult and shouting in Washington has died, is it not well for us to hold at arm's length this unprecedented plan of federal aid in states and to seek for ourselves and the health enterprise a calm and detached orientation?

It is quite obvious to all those familiar with attitudes of previous sessions that something new and quite different has been present in the deliberations of this 74th Congress so far as the sentiment toward public health is concerned. Instead of the policy to reduce federal expenditures for public health to the lowest possible level there has come into the picture the President's group for the study of social security. Along with important investigations on old age and unemployment insurance there has been conducted a systematic study of the possibility of expanding local health services through a system of federal aid to states. It is a highly significant fact that this provision for more health service was admitted to be a proper part of a broad program for social security and that it passed through the various stages of congressional consideration with less objection than any other provision of the entire bill. Since the report of the President's advisers on social security there has never been any serious opposition to the plan of increasing funds to be expended through the Public Health Service and the Children's Bureau to an amount vastly greater than has ever before been allowed for these worthy purposes. From this support we may well take fresh courage.

The ample majority of both the House and the Senate in favor of the Social Security Bill leaves no room for doubt as to the real intention of Congress to provide the means and the funds for this important purpose. That the Deficiency Appropriations Bill should have been defeated by a one-man Senate filibuster does not alter the main intent of this Congress to pass these measures and to see them tried out. There is every reason to believe that these new funds will be provided promptly by the session which begins next January and that not only

the very significant old-age and unemployment schemes but the provisions for aid to states for health can be operated during the second half of this current fiscal year.

There is abroad a feeling of disappointment among health workers who have been following the fortunes of this legislation. Instead of this tendency to an easy discouragement with the miscarriage of these plans there should be on the part of the public health profession a renewed determination to be more nearly ready to use these funds when they do become actually available. It still remains to be seen whether the added responsibilities which these millions bring can be used in such a fashion as to bring credit to the profession or otherwise. If through this delay of perhaps 4 months there can be more thorough planning, more adequate study of the principles and the technic of using the money, we may well be grateful that there was that much less haste.

It seems clear that money will be allotted to states only through organized medical bodies, state, county and municipal, and such funds must be expended solely in carrying out the purposes specified in the bill and in accordance with plans prepared by the health authorities of the various states, approved by the Surgeon General of the Public Health Service. It behooves the health authorities of every state, therefore, to perfect their organizations and personnel, and to plan for the useful and economical expenditure of such money as may come from the federal government under this act.

To a very real extent the problem now becomes one of finding the human resources to match the dollars. Wherever high quality human stuff can be found with the necessary technical information we may rest assured that the money will be well spent and that the cause of public health will be advanced through this extraordinary change in federal policy. There are those in high places who have openly predicted that the funds named in the Social Security Bill are too large to be wisely spent with existing facilities and personnel. Others connected with the studies which preceded the drafting of the Bill have urged that funds in an amount twice as large could be safely appropriated for these purposes. Only time will tell which view comes closest to the fact. It is only sure that American public health is to be tested by this new program in a telling way and we may well add prayer and fasting to our earnest endeavors to make this project a resounding success.

Surely we should take a thoroughly constructive attitude toward the disappointing features of the present and make certain that we do not fall back when there is so much obligation on our shoulders to face the future with courage and determination to make of this experiment a vindication of our faith in the cause of public health.

ROYAL SANITARY INSTITUTE HEALTH CONGRESS

THE Royal Sanitary Institute Health Congress was held in July at Bournemouth, England, under the patronage of King George and the presidency of Lord Balfour of Burleigh.

The official representative of the American Public Health Association was George K. Strode, M.D., the representative in Europe of the International Health Division of the Rockefeller Foundation. In his report of the meetings Dr. Strode points out features of this Congress which resemble the meetings of our Association, indicating that on both sides of the Atlantic it seems to be a

fact that personal acquaintance and contact with other professional workers is the most valuable part in such a conference.

At the Bournemouth meetings all papers which are presented in the program for discussion are printed prior to the meetings and copies are placed in the hands of each individual in order to facilitate discussion. Usually the author of the paper presents only a brief résumé, in this way saving the time of the listeners and avoiding the monotony of long papers. There may be those on this side of the Atlantic who will agree that our British confrères have achieved a real advance in this manner.

Dr. Strode points out that in these meetings there was a simplicity and an effectiveness in the program organization which he commends to all those who have the responsibility of setting up meetings of this character. The mornings only of the 5 days of the meetings were used for formal papers and discussion and the afternoons were devoted to features of interest, to formal receptions, and other activities. The medical officers of health, the engineers, the sanitary inspectors and the health visitors each held separate meetings and to these were added meetings for groups interested in subjects comparable to our section plan, but carrying section names which indicate a diversity of interest, such as the Sections on Preventive Medicine, on Architecture, on Town Planning and Engineering, on Veterinary Hygiene, and on National Health Insurance.

Those who are interested in the development of professional standards in this country will do well to inform themselves of the way in which the Royal Sanitary Institute across the years has succeeded in raising the standards in England.

AMERICAN CHILD HEALTH ASSOCIATION

THE passing of the American Child Health Association after 26 years of varied activities removes from the scene a unique organization and punctuates an important era in the development of maternal and child hygiene. This association under its present name was formed by a merger of the American Child Hygiene Association, and the Child Health Organization of America. The former was the outgrowth of the American Association for the Study and Prevention of Infant Mortality, organized at Yale University in November, 1909, as a direct result of a conference on the Prevention of Infant Mortality held under the American Academy of Medicine. Headquarters were established in Baltimore in January, 1910. A devoted and efficient executive secretary was employed who nurtured and developed the organization until its office was transferred to Washington, D. C., in April, 1922. At that time there were almost 2,500 members including 273 affiliated societies. This marked the peak in interest and support of its membership up to that time and the most extensive services the Association was able to render its affiliated societies.

At the Washington, D. C., annual meeting, President Hoover announced formally the consolidation of this association with the Child Health Organization of America. The latter had grown up rapidly after the war under the inspiration of a group of New York people and the forceful leadership of its Director. The program concerned itself largely with health education by arousing public interest in the health of school children and encouraging systematic teaching of health in the schools with the objective of inculcating health habits. Its appeal was largely

through weighing and measuring the children, a daily routine of health habits, and attractive literature appealing to children and adults alike.

After amalgamation, the new Association transferred its headquarters to New York City, leaving a small office in Washington, D. C. An extensive program was launched with greatly expanded budgets and considerable increase in personnel. Under a departmentalized set-up its program included the development of Child Health Demonstrations, Health Education, Medical and Nursing Consultation Services, Research, a Division of Publicity and Publications, and a Division of Public Health Relations. Attention was centered on Health Education, and on Research.

There is no question that this organization exerted a beneficent influence upon the public health by sponsoring the most approved methods for the prevention of maternal and infant mortality; by urging the necessity for better birth registration; by taking an active interest in improving the milk supply, and by popularizing health education for school children. The *Transactions* of the Association are veritable handbooks of the progress in Child Hygiene. Its attractive magazine *Mother and Child*, published for 4 years, followed by the *Child Health Bulletin*, did much to arouse widespread interest in maternal and child hygiene, and to suggest ways and means of meeting local problems. Many of the measures proposed and discussed at meetings of the association have been incorporated in state and local child health work. The schools now recognize health as a major objective of education and health education as an integral part of the school program.

The question arises naturally, why should such an organization close its doors at a time when rapidly shifting socio-economic forces demand skillful guidance in holding what has proved to be sound in the old and developing what is necessary to meet the new.

Does it signify that official health organizations are now in a position to take over largely the health work initiated and sponsored by voluntary societies? Does it mean that child hygiene is now fully recognized as one of the most important phases of the public health and should be integrated with every other health function? If so the omen is propitious. It raises a challenge, however, to other national health organizations remaining in the field to meet the increasing demands of maternal and child health, in national, state, and local units.

AN INTERNATIONAL STANDARD FOR TUBERCULIN

AS early as 1924 the Health Committee of the League of Nations requested the late Professor Calmette to study the question of uniformity of tuberculin. He accepted and his results were published in 1926. The employment of the intracutaneous test in sensitized guinea pigs was recommended for the titration.

The Health Committee made arrangements for comparative tests to be carried out in a number of well known laboratories. It was found that the tuberculin used in Frankfort-on-Main, London, Paris, and Tokio were of equal strength, so that it became possible to suggest the adoption of an international standard. This proposal was made at a session of the Health Committee held in Frankfort in April, 1928. The State Serum Institute of Denmark, located in Copenhagen, was selected as a central laboratory from which the standard preparation was distributed. The National Institute of Medical Research, London, offered a certain amount of standard tuberculin for distribution. Later, a standard tuber-

culin was produced in quantity by the Copenhagen laboratory, and since that time the international standard tuberculin has been distributed from that center.

The international standard tuberculin is tested by the shock method in tuberculous guinea pigs and also by the intracutaneous test in man. The guinea pig test is the most expensive and the most unreliable, and when it is possible to use the intracutaneous test in man it is the method of preference.

Efforts are being made in various parts of the world to obtain a better preparation for the international standard. Douglas and Hartley have prepared a tuberculin using a synthetic medium. This has been titrated against the international standard preparation. In America, Long, Seibert, and Aronson have worked out several preparations, and these are still under test. The first preparation produced sensitization, and was abandoned. A more recent preparation giving better results has been made, but still further studies are under way. Whatever the preparation, in the opinion of Madsen and Holm, it should be titrated against the present international standard tuberculin.

This matter, as well as a study of the various methods of making the tuberculin tests, is interestingly treated by Dr. Th. Madsen and Dr. Johs. Holm.¹ Dr. Madsen's position as Director of the State Serum Institute and experience as Chairman of the Health Organisation of the League of Nations assures us that the statements are authoritative.

REFERENCE

1. Madsen, Th., and Holm, Johs. Tuberculin Standardisation and Tuberculin Tests. *Quart. Bull. Health Organisation*, IV, 2:475 (June), 1935.

PUBLIC HEALTH EDUCATION*

What Needs To Be Told—Invaluable source material is given in "The Control of Communicable Diseases," *Public Health Reports*, U. S. Public Health Service, Washington, D. C. Aug. 9, 1935.

This is a revised edition of a report by an A.P.H.A. committee.

Among the definitions of terms is the following:

Education in personal cleanliness. This phrase is intended to include all the various means available to impress upon all members of the community, young and old, and especially when communicable disease is prevalent or during epidemics, by spoken and printed word, and by illustration and suggestion, the necessity of:

- (1) Keeping the body clean by sufficiently frequent soap and water baths.
- (2) Washing hands in soap and water after voiding bowels or bladder and always before eating.
- (3) Keeping hands and unclean articles, or articles which have been used for toilet purposes by others, away from mouth, nose, eyes, ears, and genitalia.
- (4) Avoiding the use of common or unclean eating, drinking, or toilet articles of any kind, such as towels, handkerchiefs, hair brushes, drinking cups, pipes, etc.
- (5) Avoiding close exposure of persons to spray from the nose and mouth, as in coughing, sneezing, laughing, or talking.

Following the definitions of terms—

Each disease is briefly described with regard to its clinical and laboratory recognition, the etiological agent, the source of infection, the mode of transmission, the incubation period, the period of communicability, susceptibility and immunity, and prevalence.

Following this are offered methods of control—first, those affecting the individual,

contacts, and immediate environment, and second, general and specific measures bearing upon the control or prevention of the disease in question.

Thus in condensed form the report presents the facts according to current medical knowledge and experience. It contains authoritative and approved data which may be amplified and interpreted to the public for general guidance and for explaining the policies of the health department. Of course this report should be of great value to health officers, departments of health, or legislative bodies in the formulation of rules, regulations, or sanitary codes dealing with the control of communicable diseases.

In some cases particular items are listed for public education, but most of the "general measures" call for public consideration, and many of the specific methods of control need to be interpreted to the public.

This report is to be issued in separate form as Reprint No. 1697, and may be purchased from the Superintendent of Documents, Washington, D. C., for 5 cents a copy. It should be welcomed by the editorial writers of newspapers.

"Telling The Truth"—Under this title the *Weekly Bulletin*, Oregon State Board of Health, Portland, discusses truth telling (Aug. 27, 1935) which may have application beyond the field of cancer control.

Shall we tell a patient the truth? This is a very important question to the doctors and to the laity alike. The answer is not simple but is beset with an unusual number of complications. It has been shown repeatedly that the avoidance of contracting fear of cancer by the dissemination of knowledge is to increase deliberately the chances of cure. It has been demonstrated that

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

ignorance which breeds pessimism is best dissipated by frankly spreading the facts concerning the nature, prevention, early diagnosis and treatment of cancer. It has taken a great deal of time, effort and money to educate the public concerning cancer. Its attitude toward the cancer problem has reached a point where it has more intelligence and less emotion than ever before. With an over-emotional public, cancer information might conceivably prove harmful. On the other hand, with an intelligent public much greater harm would be done by not telling the truth. A public trained to expect frankness offers a very different field for coöperative cancer control than a superstitious, ignorant, and timid public.

The European countries present direct and valid evidence on this point. Sweden in 1930 presented an outstanding development in cancer control. Patients with cancer were told of their condition as a routine procedure. The ways and means of imparting this information were naturally left in the hands of their physicians. In some cases more tact and care in giving this information was necessary than in others. Eventually, however, all patients were informed and a common status was attained. Conferences with numerous Swedish medical men yielded unanimous agreement as to the wisdom of this procedure. As a result of this program, the morale was higher in both the public and medical profession. Diagnosis was rapid and accurate. Treatments were prompt and were attended with remarkable constancy and tenacity. A happy, coöperative relationship was well established and functioned to the advantage of all concerned.

In certain other European nations, ignorance and fear abound. The contrast is eloquent and amazing. This is especially important when one stops to consider how far our own procedure in the United States falls short of the optimum. It is, of course, true, that there may be exceptional cases or peculiar situations which make it advisable that the patient be kept in ignorance. These will always be detected and will, by their very relationship to the ordinary situation, serve to accentuate the great value of frankness as a policy. The real question at issue is: "Have we matured sufficiently to face the truth and to hear discouraging facts as well as encouraging ones?" Most of us believe this level has been reached. To delay longer telling cancer patients the truth is not consistent with the educational program for the control of cancer.

Drastic Safety Education — A realization that "decent, intelligent people must be protected from the fools" (quoting *Collier's*) seems to have prompted drastic ideas in automobile accident prevention.

"—And Sudden Death," by J. C. Furnas, an article in *Reader's Digest*, Pleasantville, N. Y. Has been reprinted, distributed, and even read to offenders in a court room. Supplied at *two cents*, or \$1.50 for 100. With the imprint of Employers Mutuals, Wausau, Wis., copies supplied *free*.

An editorial in *New York World-Telegram*:

A new technique is being born in the nation's battle against the automotive speed demon. It is beginning to dawn on safety advocates that statistics on the number of killed and injured do not rake the consciousness of speedsters.

The discovery is now being made that about the only thing which feaze the reckless driver is the sight of mangled bodies and wreckage or the relentless description of individual cases and specific types of death and mutilation in automobile crashes.

The New York Police Department is working along this line in the use of large posters such as the one showing a motorist holding in his arms a child he had struck. But even that illustration is prettified out of its possible effectivity. There are no blood and no evidence of the childish pain and of the groans of death agony.

From another *World-Telegram* editorial:

We believe that a few ultra-realistic cartoons erected on boards along speedways showing not only the death and physical torture but also the disfigurement and even ruin of the car—pride and joy of the owners—would help bring down the outrageous number of motor accidents daily.

But we believe the cartoons would not be very useful if they only repeated the current type of poster showing a handsome young man holding a hit child in his arms—there is no anguish, pain, blood or destruction brought home in that picture. There must be if the roadside cartoon is to have much real effect.

"Step Off the Gas!" *Collier's*. April 6, 1935. A page editorial reviewing accident statistics gathered by the Travelers Insurance Company.

"Chicago Judge Sends Youthful Violators to Look Upon Death" reports the action of a Chicago judge in sending 20 traffic violators to the morgue and to the county hospital to see some results of reckless driving. *Public Safety*, National Safety Council, 20 N. Wacker Drive, Chicago, Ill. Aug., 1935. 10 cents.

In the *Chicago Tribune*, July 1, appeared a full page of photographs, pictures of 264 of the 451 persons killed in Cook County automobile accidents in 6 months.

Starting July 1 the 10,000 licensed cafes and liquor dispensaries in New Jersey were officially directed to display conspicuously a striking poster against driving when intoxicated.

"Cinematic Effects in Practical Films" describes a sound picture to "show that, while moderate drinking may do no harm, the excessive use of alcohol is very dangerous." There are explanations and illustrations of numerous movie devices for securing unusual and dramatic effects in safety films. *Movie Makers*, 105 W. 40th St., New York, N. Y. Sept., 1935. 25 cents.

But the fundamental difficulty is brought out under "Contradictions in Social Thought" in a book review by Harry Hansen in *New York World-Telegram*. The book is "Law and the Lawyers," by E. S. Robinson (Macmillan). Says the reviewer:

Professor Robinson does not say that we are kidding ourselves when we adopt laws that the social conscience does not want enforced, but that is what his thought amounts to. For instance, everybody knows that the death record from speeding automobiles is a disgrace to our nation, but that does not stop speeding. The law makes a certain attempt to stop speeding. People who break the laws are arrested, and "the public thus protects itself against the guilty feeling that nothing is being done."

But that does not stop injuries and deaths by automobile. The manufacturer continues to talk up high speed when he sells his cars; the authorities continue to build roads intended to make speed possible without accidents. Individuals like to believe that the accidents that happen to others will not happen to them. Psychologically, our present adjustment is purely symbolic. Professor Robinson wants the law to be realistic.

"What It Would Mean to You"—From the "Foreword" of "That Eyes May See":

Think what it would mean to you, if you had never seen a Mississippi red bird; or a waxy white magnolia bloom upon a glistening green bough; or a field of feathery cotton; or a tall and stately pine; or a sunset on the coast!

This pamphlet from Mississippi State Board of Health, Jackson, presents lists in the form of diagrams which seem to give them new interest values. "Danger Signals" is really a list of 9 warning signs to teacher or parent that a child's eyes need attention, but offered as a full-page "diagram" it looks more interesting and readable than is usually the case.

Frowning	} Danger Signals
Watery Eyes	
Fatigue After Continued Use of Eyes	
Blurred Vision	
Soreness or Redness of Eyelids	
Puffiness of Eyelids or Under the Eyes	
Drooping of Lid	
Headache, Mild or Severe	
Aching of Eyes	

Book Reviewers Talk Mental Hygiene—Again mental hygiene benefits from the published experiences of one who has been through the mill.

Doubtless "Asylum," by William Seabrook (Harcourt, Brace & Co., New York), will be formally reviewed in the *Journal*. So these paragraphs are merely to call attention to the extensive reviews the book has been receiving. Written with intelligence and sympathy these reviews have presented phases of mental hygiene and its ap-

plication to a wide reading public. The reviewing, also, as has been said of the book, is "a milestone along the arduous way of humanizing the approach to the mentally affected."

When the Report Is Mimeographed—The annual report of a county health department is before me. It is mimeographed on 6 sheets, plus a title sheet, all on the plain, commonplace mimeograph paper. A staple at the middle of the top of the sheets fastens them together.

Suggestion one: Move the staple to the upper left corner.

Suggestion two: Use a tinted mimeograph paper. See the bulletins of Health Department, Middletown, N. Y., and New Mexico Bureau of Public Health to see what results from use of color in the paper, plus a sense of design in the layout of the pages.

Where Is It Published?—Reprints from professional and popular magazines would be more valuable to possible readers and students if more fully identified.

Some medical journal reprints at least give the city of the authors. *A.M.A. Journal* reprints carry the full name and address of the Association.

But two reprints from Milbank Memorial Fund, for example, give no addresses for publisher and authors, and no obvious indication of the official status of the authors. This means extra office detail in any library where there is careful filing and cataloging.

How May They Get It?—Will the author or publisher send free a copy of a reprint? Will the health survey report be sent upon request? Are samples of this or that available to any health worker?

Or, is there a price? Will it be sent for 3 cents postage? Is the distribu-

tion limited to the one state? Is it available only to school people?

At least every editor who receives a reprint or other publication would like answers to the above and similar questions. Then the editor could be more precise in his mention of a publication. He could mention material without fear that his readers might write fruitless letters. And the editor could be sure that his readers will do their share in sending postage or a price.

Thus editor and reader both will be the happier.

Health Education in August, 1935, Journal—There was much of direct interest to the health educator in the August, 1935, issue of *American Journal of Public Health*.

The quotation from Bernard Shaw, "Experts Wrong and Genuine" (page 912) might be reread to advantage whenever we call upon "experts" to evaluate our health education activities or materials.

"The Teaching of Epidemiology by Applicatory Problems," by Munson (pages 913-919), concerns professional instruction, but the recommendation of Sherlock Holmes as collateral reading, and the readable details of a new case history plan, can be applied to both school and popular health education.

In "Sewage Contaminated Irrigation Water," by Chapman (pages 930-937), is expressed an optimistic faith in the people in connection with much intestinal disease:

This condition among us has persisted because the majority of thinking people, the sort of people who are sensitive to matters of hygiene, have not realized that it existed. I am convinced that all that is necessary to end this repellent situation is to inform the people of the facts.

"Diphtheria in Grays Harbor County, Washington," by Laue (pages 948-949), reports a rural county campaign.

"A Neglected Opportunity for the Control of Respiratory Disease," by Calver (pages 953-958), emphasizes education and public opinion touching food and drink cleanliness.

"Health Today and Tomorrow," an editorial (page 960), presents the educational campaign which is to culminate in October.

"Books and Reports" (pages 973 and 977) reviews books on phases of school health education.

"Conferences" (pages 987-988) gives dates of gatherings from which we should get material for various uses, including news in newspapers.

Radio Child Study Club — In October will open the fourth year of aid to communities in Iowa in organizing study groups. Leadership is provided by Iowa Child Welfare Research Station in coöperation with Iowa State College and Iowa State Teachers College.

Four courses are offered—one concerned with the newborn infant, one with preschool children, one with school-age children, and one with adolescents. Each course is built upon a two-year plan, twelve discussions the first year constituting the first series and twelve the succeeding year constituting the second series. Parents are encouraged to complete the two-year cycle in each course chosen to gain the fundamentals involved in intelligent guidance of children. They may register for one or more courses.

A program is broadcast for each course every two weeks through the radio stations of the University of Iowa (WSUI) and Iowa State College (WOI). The broadcasts relating to the infant and the preschool child are given on alternate Tuesdays at 2:30 P.M. over WOI and at 8:00 P.M. over WSUI. Those concerning the elementary school child and the adolescent are given on alternate Wednesdays at 2:30 P.M. over WOI and on alternate Thursdays at 8:00 P.M. over WSUI. Parents may enroll under the group or individual plan.

For the plan and materials for groups or individuals, address University of Iowa, Iowa City, or Station WOI, Ames, Iowa.

Building a School Health Library — Many requests for health information from teachers and pupils of Avon Avenue School, Newark, N. J., led the health counselor of the school to approach the librarian of the Board of Education who—

was receptive to the idea and willing to give assistance. As a preliminary step, she sent a full-time ERA worker to the school who immediately began the work of organizing books, pamphlets, posters and pictures. Since all the books fell into the category of health which made their classification identical, we marked the books alphabetically according to the author's last name. The posters, pictures, and pamphlets were filed accordingly. A card bibliography was made, headed by the topics most emphasized in the grades, sleep, rest, cleanliness, food, etc. Under these headings we compiled lists of books available in our library containing the best material on the subjects. To make matters even simpler we indicated for what reading level each book was suited. For circulation purposes we used a loose-leaf notebook which served as a record of the total collection as arranged on the shelves. One title was included on each sheet and the borrower's name was recorded on this sheet.

At present our health library consists of more than two hundred books. Among these are the most recent and useful for teachers and pupils. We keep our library up to date by the addition of new books, by subscription to current health magazines, and by soliciting various health agencies throughout the country for pamphlets, pictures, etc. The Board of Education appropriates a certain amount of money each year to each school for the purchase of books, so that we are able to secure some in this way. We try to get the pamphlets and pictures free or at very small cost. We are well on our way to the establishment of a good picture and pamphlet collection for use in the classrooms.

"Building the Health Library," by M. V. Fitzpatrick. *Public Health Nursing*, 50 W. 50th St., New York, N. Y. Sept., 1935. 35 cents. A list of books most frequently consulted by teachers and pupils will be supplied at the above address. Enclose reply postage.

A much more ambitious plan for a school of nursing is described in

"Making the Resources of the Library Available," by E. Wigmore. *American Journal of Nursing*, 50 W. 50th St., New York, N. Y. Aug., 1935. 35 cents.

There is a decimal classification, discussion of cataloging, filing method, etc. Regarding the section on health education, the article says:

The making available of health education materials to the student nurse is a technic that should be taken seriously by all school libraries. . . .

Not only the school but the school library must take cognizance of this enlarged responsibility and assemble for the student nurse's information and use representative health education materials, those tools of the health educator.

Bequests for Public Health—The recent reminders that the A.P.H.A. might well be remembered in the making of wills stimulate the thought that public health in general should share more largely in bequests for the public good.

Men and women are making wills notwithstanding the current economic disturbances. Public health agencies must exert themselves now to be remembered later.

Some of the steps to be taken are outlined in a memorandum entitled "Bequests and Trusts," supplied by Social Work Publicity Council, 130 East 22d St., New York, N. Y. 10 cents.

A Pathometer for Health Administrators—To put the leading infectious diseases "on the spot" day by day New York uses a simple device.

In the pathometer here described we have a simple and very useful device for keeping an up-to-date record of the various diseases ordinarily reported to the health authorities. It consists, essentially, of a large framed cardboard showing the ten or twelve major infectious diseases in a manner illustrated by the accompanying graph. The space comparable to the tube of a thermometer

is cut out, and behind this is a piece of tape, part white, part colored, so fixed by rollers above and below that it can be moved up and down. At the beginning of each month the tape is so adjusted that the seam between the upper white portion and the lower colored portion is at zero. Each day, as cases of the disease are reported, the tape is rolled, so that the colored portion indicates the total number of cases reported during the month up to that time.

From the experience of the past five or ten years, depending upon circumstances, one calculates the average case expectancy for the particular month, and this expectancy is indicated by means of a small cardboard tab fastened as shown in the illustration. In measles it is well to calculate an expectancy for "measles years" and "non-measles years," for the figures often vary enormously.

In the headquarters of the New York City Department of Health, one of these pathometers is kept constantly up to date in the Bureau of Preventable Diseases; another in the office of the Commissioner of Health. The latter, therefore, is at all times in touch with the prevalence of the reportable diseases in the city.

Naturally, this is only one of the devices used to keep in touch with the situation, for in addition to this, pin maps to show the geographic distribution of the diseases, as well as other graphic records are also utilized. The pathometer has not been patented and is here described in the hope that the device will be of service to other health administrators.

—In *Quarterly Bulletin*, Department of Health, New York, N. Y. No. 3, 1935.

If you lack the desire for home construction, and do have the money for a purchase, a manufactured device will be supplied by Educational Exhibition Co., Custom House St., Providence, R. I.

Pan America Resolves—The Ninth Pan American Sanitary Conference, reported in *Public Health Reports*, Washington, D. C. (Aug. 30, 1935), resolved that

the principles of hygiene should be taught in public schools and other institutions of learning.

The Pan American Conference also recommended educational work in schools as a means of combating alcoholism.

Dramatized Radio Programs—"Your health, ladies and gentlemen" will introduce the new radio program of the American Medical Association. Beginning October 1, 1935, it will be offered over the Blue network of N.B.C. A list of the 28 stations will be supplied upon request to the A.M.A.

For every Tuesday, 5 P.M., E.S.T., a new type of program, in vivid dramatic form with incidental music, is being developed, showing medical emergencies and how they are met. The hero, the doctor who is available day and night for the protection and promotion of your health, is the real sponsor of this series of practical and entertaining health broadcasts.

Dental Health Education in Iowa—The Iowa Dental Education Plan has an 8-year history. It is conducted by the Bureau of Dental Hygiene, University of Iowa, Iowa City. The Bureau provides classroom supplies; teaching helps through the school year; visual material; school and community service. For a description of the plan and the materials send 5 cents to the Bureau for "Bulletin No. 361."

Free Health News Service—"What About the Health of Men Over Forty?," by Dr. John L. Rice, and "Back to School Go Children Next Month: Here's What Parents Should Do About it," by Dr. Allen G. Ireland, each a series of 10 to 12 brief news releases, are the latest from Health News Service, 22 E. 40th St., New York, N. Y. This is the "news feature syndicate organized to disseminate scientific knowledge of public health throughout the United States," furnished by milk interests, but free from trade propaganda.

Hygeia, September, 1935—Topics for talks and articles, quotable ma-

terial, reference and background material for popular use, are found in *Hygeia*, 535 N. Dearborn St., Chicago, Ill. Here are selected articles from the September, 1935, issue:

School health policies. School report cards (their significance). Osler the man. Curious stories about health (a new series). What's behind the label? (cases of dermatitis from toilet preparations). Obesity, the open door to diabetes. Diphtheria—the big bad wolf (diphtheria no longer invincible). What should your child dance? Hygiene of the eye. The mystery of the red-faced man (medical detecting). Primitive medicine (among the Zulus). Powders and syrups for food drinks. The art of the toothbrush. Paul Ehrlich (another pioneer scientist). How to spoil a child (coddling the convalescent). Is basketball a girls' game? How bacteria grow. New books on health. Questions and answers.

In "School and Health":

The use of textbooks (in teaching health). Health teaching in September. Teaching health through a study of communicable disease. The "why" of some health habits (how children may be taught reasons for health habits). The study of foods begins in the (school) cafeteria.

DATES AHEAD

Oct. 6–12. Fire Prevention Week. Program material from Nat'l Board of Fire Underwriters, 85 John St., New York, N. Y.

"Empire Health Week" in Jamaica has been changed from Oct. 6–12 to Oct. 20–26, 1935.

FOR EDUCATION AND REFERENCE

A group of reprints on medical aspects of dysentery are supplied by Dr. Joseph Felsen, 667 Madison Ave., New York, N. Y.

A new poster calling attention to public health nursing is offered by National Organization for Public Health Nursing, 50 W. 50th St., New York, N. Y. Samples: on paper, 20 cents; cardboard, easel back, 30 cents. Low quantity rates. Space for local agency imprint.

The last contribution of the National Tuberculosis Association to the 1935 Early Diagnosis Campaign is a collection of "Quotations" assembled from "nationally known authorities on tuberculosis." The new feature is the comment on each quotation which interprets or amplifies the quotation for popular use.

"An Organized Community Health Education Program," by Savel Zimand. Reprint. *Milbank Memorial Fund Quarterly*, 40 Wall St., New York, N. Y. A valuable descriptive outline.

"Children's Bureau and Other Publications Relating to Children." Supt. of Documents, Washington, D. C. *Free*. If desired ask also that future revised editions be mailed to you.

"On Health's Highway: Progress in Relation to Cancer Control." New York City Cancer Committee, 150 E. 83d St., New York. Large pages: on the left, quotations from leading physicians; on the right a group of pictures. Presents medical and surgical progress through animal experimentation, under "Surgery," "Physiology," "Pharmaceuticals," etc. No price given.

"Public Health Service Publications." List of publications issued, Jan.-June, 1935. U. S. Public Health Service, Washington, D. C. *Free*.

"Rural vs. Urban Longevity." *Statistical Bulletin*, Metropolitan Life Insurance Co., New York, N. Y. July, 1935.

"Safe Milk: A Public Health Measure," in *Dairy Council Digests*. National Dairy Council, 111 N. Canal St., Chicago, Ill. June-July, 1935. No price is given, nor the address of N.D.C.

"Suggestions for Reading in Public Health Nursing." A new edition of list of publications of National Organization for Public Health Nursing, 50 W. 50th St., New York, N. Y. *Free*. Professional and organization topics, with section on publicity.

MAGAZINE ARTICLES

"Medical Care for the Unemployed." Los Angeles County to give free services to its 400,000 idle. *Literary Digest*, 354 4th Ave., New York, N. Y. Aug. 10, 1935. 10 cents.

"Playing Safe," by E. R. Grannis (safety); "Spare the Mother," by E. S. Enochs (maternal mortality); "When Illness Comes," by K. B. Oettinger. *Parent-Teacher Magazine*, 1201 16th St., N.W., Washington, D. C. Aug., 1935. 15 cents.

"Where Every Child Gets Dental Care—and the Dentist Gets Paid!" by C. P. Streetor. *Farmer's Wife*, St. Paul, Minn. Sept., 1935. Copy free.

MOTION PICTURES

"The Greatest Mother," Red Cross picture, is available, sound or silent, 35 mm. or 16 mm., rental or purchase. Apply direct to W. J. Ganz Co., 19 E. 47th St., New York, N. Y.

Moving rapidly through views of Red Cross services, with the tempo of the "March of Time" films, the movietone illustrates strikingly the type of activities in which Chapters throughout the nation are engaged. Actual scenes of disaster, showing rescue of flood refugees, feeding by Red Cross Chapters, and dramatic force of flood waters, hurricanes and the like, bring home with force the fine accomplishments of the volunteers under Red Cross direction.

The work of the public health nurse, of the Gray Ladies and others in hospitals and in their contacts with disabled war veterans, are depicted.

"The Mosquito: Public Enemy." Sound, 2 reels. U. S. Department of Agriculture, Washington, D. C. Discusses the mosquito as a pest affecting man and beast, varieties and life history, safeguards and methods of control.

"Pulling Teeth With a Movie Anesthetic," by R. Arell. *Trained Nurse*, 468 4th Ave., New York, N. Y. Aug., 1935. 20 cents. How a dentist uses overhead movies to distract child and adult patients. For clinics and institutions?

Current Releases of Non-Theatrical Films and Film Notes, Department of Commerce, Washington, D. C., in May issue announced the following:

Several medical pictures, by Medical Cinematographic Society. Apply to: S. A. Bloch, 1865 52d Street, Brooklyn, N. Y.

"Milk the Master Builder," and "Preventing the Spread of Disease." National Motion Pictures Co., Mooresville, Ind.

RADIO

"On the Air." National Broadcasting Co., 30 Rockefeller Plaza, New York, N. Y. A promotion pamphlet. Text and pictures give an interesting review of radio history.

Recent health broadcasts reported to us are listed below.

Baltimore City Health Department:

Jerry Junior is ready for school. Sleep. Vaccination. Do it now. Mr. Strong inquires about infantile paralysis (dialogue). Infant care during hot weather. The black widow spider.

Illinois State Department of Health broadcasts over WHFC and WGN. Some topics:

Lockjaw a summer-time hazard. The ubiquitous mosquito and its relation to man. The "outer" and "inner" man on vacation. Foods, freight and advertising.

Minnesota State Medical Association broadcasts every Tuesday, 11:15 A.M., over station WCCO, Minneapolis and St. Paul. Some topics:

Getting ready for school. Diet and health. Shingles. Carhuncles. Foreign hodies in the eye. Pre-natal care. Ticks and disease. Women in cancer education.

Ohio State Department of Health broadcasts regularly over 4 stations in Columbus: WOSU at 2:30 P.M., Mondays and Tuesdays; WBNS at 1:30 P.M., Thursdays; WCOL at 2:00 P.M., Thursdays; WAIU at 4:15 P.M. every Wednesday. Some of the topics:

The diagnostic chest clinic. Health of the school child. Diphtheria. How your Health Department is meeting your problems. Debunking the medicine chest. Conservation. Do we eat to live? Undulant fever and psittacosis. The school nurse. Evolution of the bath. Am I worthy the name "Good Parent"? Health insurance. Typhoid vaccination: its utilization as an individual safeguard. Tuberculosis control and the school child. Maternal and child hygiene program under the social security act. Carbon-monoxide poisoning. Hidden hunger. Just teeth. What have you on deposit in your health bank?

SCHOOLS

"A Project in Rural School Health Education," by R. E. Grout. Reprint of 4 articles. *Milbank Memorial Fund Quarterly*, 40 Wall St., New York, N. Y.

The latest venture in poster contests is sponsored by the Indiana Tuberculosis Association (130 E. Washington St., Indianapolis), and associated organizations. The plan will not help to interpret any particular aspect of health, since

The poster theme is left largely to the student but should be classified under one of the following subjects (which range from "Food and nutrition," to "Sex character education").

BOOKS AND REPORTS

What You Should Know About Heart Disease—By Harold E. B. Pardee. 2d ed. Philadelphia: Lea & Febiger, 1935. 127 pp. Price, \$1.50.

The author has written an authoritative presentation of many of the aspects of diseases of the heart. His style is simple and understandable for the layman. The tone of the book is helpful and not alarming. The author clearly states that there are many diseases of the heart, and yet he clings to the old title of Heart Disease. It seems to the reviewer that it would have been better if he had changed the title of the book to "What You Should Know about Diseases of the Heart." It is very important that this newer conception be disseminated widely.

It is questionable whether in a book for the layman it is desirable to include instructions for diet and diet lists. It has always seemed to the reviewer that the writer of such a work should be scrupulously careful to avoid giving information that may tempt the patient to treat himself without proper medical supervision.

These are the only criticisms of the book. It is undoubtedly a valuable contribution in its own limited field.

EDWIN P. MAYNARD, JR.

Epidemics and Crowd Diseases: An Introduction to the Study of Epidemiology—By Major Greenwood, D.Sc., F.R.C.P., F.R.S. New York: Macmillan, 1935. Price, \$5.00.

In his chapter on diphtheria, Major Greenwood digresses to say: "Just as the enjoyment of detective fiction (of which I am a passionate admirer) is marred by foreign and unfamiliar at-

mosphere—one pines for the fictitious Scotland Yard when one is conducted through the fictitious Sûreté—it is (to me) easier to follow epidemiological plays when the characters move on a familiar English stage." Add that the author is the distinguished President of the Royal Statistical Society, and one has the keynote to this book. It conforms perfectly to the classical lines of British statistical epidemiology.

The first part is an historic review of the efforts of medical philosophers—Hippocrates, Galen, Dr. Caius, Fracastori, Sydenham, and others—to discover the "laws" governing the origins, movements, and distributions of "crowd" diseases. They failed, Major Greenwood maintains (not because they were attempting to bridge the chasm of exact knowledge by sheer force of intellectual effort, not because the invisible world of microscopic and ultra-microscopic parasitic forms of life had not yet been revealed, not because of the lack of development of the experimental method—but) because of the lack of a vital or medical statistical system codifying experience. This much needed statistical methodology was finally developed by the English school in the 18th and 19th centuries particularly as a result of the famous Bills of Mortality and the labors of John Graunt and William Farr. The biometricians—Quetelet, Francis Galton, Karl Pearson, Sir John Brownlee—led the way in perfecting the technic of analysis of the mass data of disease. The author admits that, so far, this new statistical calculus has failed to solve the problems of secular variation, change of type, method of spread, which the old pneumatists and other epi-

demologists who lived "before the deluge" speculated about, but he has great hopes for the future. He rightly points out that in contributing methods this school has had a profound influence on medical science in general. In commenting on this section of the book it is interesting to note that he regards Pettenkofer as a great epidemiologist and does not even mention John Snow.

He concludes the first portion with a chapter briefly reviewing the contributions of experimental epidemiology, and three on what he terms the "procatartic" (or predisposing) causes of illness—nutritional, occupational and psychological. He terms his treatment of these subjects superficial and incomplete,—with which we agree. After devoting several pages to a discussion of the soul-body relationship and the possible influence of mind upon illness he concludes: "It is certainly not my business as an epidemiologist to expound psychology of which I know little or metaphysics of which I know even less."

In the second part Major Greenwood finds it his duty to apply the general principles of epidemiology to particular cases of crowd diseases among men. Apparently he means by "general principles of epidemiology" the methods of statistical analysis of mass data. He selects for this purpose the typhoid group, cholera, typhus, measles, diphtheria, scarlet fever, smallpox, plague, epidemic diseases of the central nervous system, influenza, venereal diseases, tuberculosis, and cancer. His treatment is largely an historic one, tracing the earliest origins, epidemic movements and some of the distributions of each disease. He makes no effort to give a complete concept of the host-parasite relationships involved in the infectious diseases on the basis of present-day knowledge.

The material which he presents is selected casually to illustrate the application of the statistical technic.

Incidentally he devotes two chapters to a discussion of whether Sir John Simon was correct in his apotheosis of Edward Jenner as an Ideal Philosopher or whether Charles Creighton was more correct in regarding him as the Complete Rogue, and gives an illuminating account of the circumstances surrounding the introduction of vaccination against smallpox.

The author is very largely absorbed with the variables which affect the human host. The bias is very decidedly for *homo sapiens*. Unfortunately there are no Bills of Mortality for rats, lice, and fleas. Parasites are generally referred to as *materies morbi*. The hereditary and "procatartic" causes of variability in virulence, infectivity, selectivity, etc., of bacteria and viruses receive little attention. The author is largely oblivious of the advances in exact understanding of the biology underlying infectious diseases made during the past quarter century. References of any sort are meager, but such as there are refer almost exclusively to English and German historical or statistical literature.

Withal, the book is delightfully written, rich in classical allusions, contains interesting historical material, and is an excellent introduction to the use of the statistical method in epidemiology.

KENNETH F. MAXCY

Community Programs for Summer Play Schools—By LeRoy E. Bowman. New York: Child Study Association of America, 1935. 48 pp. Price, \$.35.

This text is a study of the summer play school. It shows the need of more adequate child recreation and the opportunity for it. It discusses the history and comparative development of the summer play school program, and puts forth the suggested programs with advice as to organization, personnel, and plant equipment.

There are several interesting tables on the number and proportions of boys and girls enrolled in the principal "Social Agencies for Youth" in the states and leading cities of the United States.

This is a worth while summarization of a special phase of education.

CHARLES H. KEENE

Happy Health Stories—By Mildred H. Comfort. Chicago: Beckley-Cardy Co., 1934. 160 pp. Price, \$.70.

Children in school today ought to be intrigued into living a healthy daily routine if the many attractive books coming from the publishers can be a prophetic gauge. *Happy Health Stories* is another one of the attractive health readers on the market and its gay illustrations increase its appeal to children.

Another one of its assets is that the story-book children are engaged in delightful activities in a world of realities, such as picnicking, egg-gathering excursions, gardening, and marketing.

The book has been written for the fourth grade level, so the question regarding the grading of material for those young readers arises. It is prompted by such statements as:

Fruit juices were full of vitamins. They were cooling and refreshing.

Citric acids in case of thirst, fatigue and overheating.

A calorie is about the amount of heat needed to make a half teaspoonful of water one degree warmer.

Another reference is made to mineral salts. Are children of the fourth grade in our average urban and rural schools equal to coping with statements from the field of physics, chemistry, and dietetics, without some preliminary facts leading up to them?

The average fourth grade child has not a clear conception of vitamins. How many adults have? Too, if we are

talking to elementary grade children about vitamins, why dress it up in a spelling like Vita-Mins? However, as a supplementary health reader stressing foods and nutrition the book will be appreciated by many teachers looking for new material. ANNA B. TOWSE

Your Child Is Normal—By Grace Adams, Ph.D. New York: Covici, Friede, 1934. 241 pp. Price, \$2.00.

This book, covering the first 7 years of childhood, is not only written interestingly but should prove adequate and comforting to the average parent. It has an easy, facile style and a homey spirit which will carry it far into the emotional and intellectual graces of its readers. Many of the "child guidance" texts are written in the bias of a particular school of psychology and it is welcome to find that *Your Child is Normal* is free of such sectarianism. It is a surprise to know that normal, average childhood needs to be stressed—we have heard and read so much of its aberrations and vicissitudes.

Its opening chapter on The Normal Child and the Average Child gives lucid, concise, scientific data concerning norms of development which are too often assumed to be known. The discussion of masturbation, for example, is well done, calmly and clearly set forth. The author wisely takes the middle ground, avoiding those who would favor absence of inhibition and those whose prudery would drive them to forceful (and unsuccessful) repression of the child's biological curiosity. The quotation from Ellis (page 115) is to the point: "Sexual precocity, while by no means necessarily of evil omen, is less promising for future welfare than its absence."

The advice is timely, for there seems to be an inordinate stressing or, at least, encouragement of much sex curiosity rather than advice as to the simple meeting of questions as they arise.

Chapter XII gives practical examples of the "why" and "how" of these biologic questions as they come from the child.

The author has been true to her foreword: "I have tried . . . to present a picture of young childhood . . . which will still be recognizable to those who know children better in the natural environment of their own homes . . ." I commend the book heartily and trust that its comfortable logic will bring surcease to parents who, while wanting information, have been intimidated or repelled by the didactic bias of some other texts they may have attempted. MAURICE A. R. HENNESSY

Psychology and Health—By H. Banister, M.Sc., Ph.D. New York: Macmillan, 1935. 256 pp. Price, \$2.50.

Here is a volume that develops with care and readability the doctrine of eclecticism in the application of psychology in medical practice. The author amply outlines the theories of Freud, Adler, Jung, Janet, and others, not in the terms of a protagonist or special pleader but rather as one who is seeking with intelligent criticality all possible common factors that may represent the residua of truth. The contents as a whole are of service to public health officials only to the degree that psychology enters into the fostering of personal health. The entire subject of the psychoses, however, is omitted as the therapy involved is so questionable, but there is a clear discussion of the psychic difficulties that follow a variety of physical illnesses.

The preventive aspects of mental disorder which concern public health administrators are emphasized in the last chapter in terms of education which has as its goal a well integrated character based upon strong and well adapted sentiments. Throughout, stress is placed upon the sentiment forming

tendency in terms of attraction and repulsion based upon pleasant and unpleasant feeling tone. While to a large extent temperament is regarded as particularly affected by the endocrines Banister recognizes that the glands are subject to many elements derived from the environment as well as from personal experiences. The protective strength of sentiments in stabilizing of character arises when they are fixed upon objects that tend toward permanence and are unlikely to be lost.

It is rather interesting to find that the author deems psychology somewhat shocked by psychoanalytic conclusions because, as he interprets it, psychology has not rejected the false nor absorbed the true elements that may have arisen from psychoanalytic doctrines. Psychology cannot be shocked but some psychologists may be timid, conservative, or critical in relation to theories difficult to substantiate in a satisfactorily scientific manner.

All public health officials will agree that mere knowledge in itself is not a preventive and may perhaps agree that public health service would be improved if individual citizens understood the relation of sentiments to socially approved activity. Certainly the major proportion of the difficulties in public health arise from an indifference in sentiment toward the practical meanings of public health work. There exists a definite hazard to the general public well-being, as a result of the incidence of mental instabilities, and psychiatric disorders. Probably the public is penalized economically and socially because too many individuals suffer from insufficient integration of sentiments and character in terms of their responsibility for themselves, their family, or their community. Hence it is the indirect influence of the psychological approach and the implications of a rationally adapted psychology that may be of interest to

public officials, whose specific problems concern masses of men rather than individuals.

Whatever improves the mental health of individuals lightens the tax burden and diminishes the tensions of living that are subversive of group welfare.

IRA S. WILE

Training in Psychiatric Social Work at the Institute for Child Guidance, 1927-1933—By Sarah H. Swift with a Foreword by Lawson G. Lowrey, M.D. New York: The Commonwealth Fund, 1934. 177 pp. Price, \$1.75.

This little book, as the title indicates, describes and discusses the psychiatric social work training program at the Institute for Child Guidance, New York City, during the years 1927-1933.

Psychiatric social work is relatively young and so is the field of child guidance. It is within these areas of activity that the volume under review concerns itself. Chapter I therefore appropriately discusses "Changes in Concepts of Training in Psychiatric Social Work." The changes have varied with the current trend of thought in psychiatry and also with the development of psychiatric social work as an entity. "Training is naturally affected by these shifts in emphasis." Psychoanalysis of the social worker herself is a factor in the shift in emphasis, sometimes causing the worker to assume total responsibility for the case. Miss Swift does well to query whether *shared* therapeutic responsibility will be abandoned. Seemingly *directive* responsibility has already passed from the psychiatrist. Probably the last sentence in this introductory chapter gives the key to the book. "It is in this direction, then, that the essential art of training lies, and while we should not *wish* to minimize the value of accumulated knowledge and

development of skills, it is only through our own *wish* to grow and mature that we can achieve the fundamental strength and perspective which may serve to stimulate in others the *wish* to develop a creative fulfillment in their own terms" (*Italics mine*). *Wish* unfortunately need not lead to *wisdom*.

Miss Swift has done a good job in discussing the program of training at the Institute as it relates to the utilization of case material and the supervisor-student relationship. This part of the book is of value to all who are interested in a training program in psychiatric social work. The examples given of individual training experience clearly and succinctly set out the differences in the human material under training. But one may well question whether a philosophy of case work that places major emphasis on the solution of problems by means of a dynamic relationship which will cause "the development in the student of an ability to 'resign her reliance upon social norms, moral standards and sound treatment plans, in favor of limited treatment ends and the stimulation of growth processes within the individual which may carry him she knows not where' may be considered the criterion of success."

However, Miss Swift is not unmindful of the fact that different emphasis on case work responsibility and objectives in treatment might exist in other clinics and that "in so far as such differences do exist the training emphasis will vary." Hers is an account of the work in one clinic and she undoubtedly has given a fair report of the work done there.

Such a book as this one has value. It tends to cause others to come to grips with a most important field of training—psychiatric social work—and with the philosophy underlying it.

HENRY C. SCHUMACHER

Lilly Research Laboratories. Dedication. Indianapolis, Ind., 1934. 128 pp.

The dedication of the Research Laboratories of Ely Lilly and Company, October 11 and 12, 1934, carried to Indianapolis a remarkable gathering of scientific men, including four Nobel Prize winners. There were a number of addresses by notable men.

The present volume is a collection of the addresses made on that occasion, including the address of welcome by the head of the firm, Mr. Eli Lilly. Scientific addresses were given by Dr. Irving Langmuir, Sir Frederick Banting, Sir Henry Dale, Drs. Elliott P. Joslin, George R. Minot, Frank R. Lillie, George H. Whipple, Carl Voegtlin, George H. A. Clowes, and others.

The volume is beautifully printed and illustrated and ends with a list of those who attended. It is valuable not only on account of the addresses given but also as a souvenir of an unusual character.

MAZÛCK P. RAVENEL

Maryland State Department of Health Report of Bureau of Sanitary Engineering—1934—By *Abel Wolman, Chief Engineer.*

This report is full of outlines of original technical studies of the Engineering Division of the State Health Department and a summary of the various activities of the Bureau.

It is pointed out that the incidence of typhoid fever continues on a downward trend.

Approximately \$4,400,000 worth of plans for work were submitted to the department for review and the major portion of the total expenditures were financed through the aid of the Emergency Public Works and the Civil Works Administration of the Federal Government.

An outline of the work done by communities during the year 1934 is listed under the following headings: Water

Supply & Sewerage; Metropolitan Districts; School; Camps, Swimming Pools, Summer Resorts; State Institutions, and Sealing Abandoned Coal Mines.

Approximately half the report is given over to a summary, in some little detail, of special technical studies under the following headings: Water; Sewerage; Industrial Wastes; Stream Pollution; Industrial Hygiene; Miscellaneous and Oyster Survey.

An example of the type of studies made is shown by the studies that were carried out under the heading of "Water." These studies included:

1. The study of the "internal corrosion of distributing mains on the Cumberland supply"
2. The "maintaining of chlorine residuals in remote sections of the Hagerstown distributing system"
3. The "efficiency of a zeolite iron removal unit of 27,000 gallons capacity"
4. The preliminary study of the water supply of LaPlata with reference to some "objectionable characteristics of the water"
5. Study of the "new Pines-on-Severs iron removal plant"
6. Study of the "turbidity and iron stain difficulties" existing in the Epping Forest water supply
7. Studies "to obtain complete removal of iron and lighten the load on the pressure filter by improving the settling characteristics of the floc" on the Sparrows Point water supply

It is stated that activated carbon is applied to the water for taste and odor control at 13 supplies, placing Maryland among the leaders in the use of activated carbon for taste and odor control of the public water supply.

Special studies have been made under each of the above headings comparable to the studies made under the water supply heading.

A study of this report by the Bureau of Sanitary Engineering of the State Health Departments, as well as Municipal Health Departments should be stimulating to those engaged in this branch of public health work.

ALFRED H. FLETCHER

Nursing Mental Diseases—By *Harriet Bailey*. (3rd ed.) *New York: Macmillan*, 1935. 258 pp. Price, \$2.50.

Not much comment needs to be made on this splendid text in its third edition, as most nursing schools are familiar with the earlier editions and know their value. This one is very similar in content to the earlier issues only it has been simplified. For instance, the introductory chapter on psychology has been omitted as there are good psychology texts for nurses available now.

A brief summary of personality development and alteration is given in this text for the first time to emphasize the importance of understanding mental reactions in order to nurse mental disease patients more efficiently.

Mental hygiene and the preventive aspects of mental disease are dwelt on in a way to please all public health workers.

The whole book is eminently practical because it is written by a nurse who knows from long years of practice what she is talking about.

EVA F. MACDOUGALL

A New Deal in Liquor: A Plea for Dilution—By *Yandell Henderson*. *Garden City, N. Y.: Doubleday, Doran*, 1935. 239 pp. Price, \$2.00.

This is an interesting book containing a wealth of material regarding alcohol as a social and physiological problem. The author makes points which apparently are understood neither by the general public nor by our legislators. The law fixes the same tax on the "proof gallon" as on the "wine gallon when below proof," which in his opinion amounts to taxing the water with which alcohol is diluted, taking away the incentive to dilute spirits, and promoting strong liquors.

He says that America has a liquor problem unlike that of any other coun-

try. American life is deficient in such social pleasures as are typified in the German beer garden. He objects to the sale of distilled liquors over the same bar as beer. He believes that the solution of the liquor question for us lies in the consumption of the milder alcoholic beverages. We should regulate the sale of spirits somewhat as we do that of opium, and of lighter beverages as we do tobacco.

The introduction of beer in the third quarter of the last century reduced the consumption of spirits by one-half. The consumption of wine has remained nearly stationary and at a low figure for several generations, and there is no indication of an increasing taste for wine. Unlike many other peoples, we do not take alcohol with our meals, but drink before and between meals.

The author holds that alcohol becomes seriously habit forming and harmful only when it reaches between 15 and 20 per cent by volume, and the higher the concentration, the greater the injury to the individual as well as to society. By confining drinking to beverages below 15 to 18 per cent by volume the peculiar American problem would largely disappear.

The book contains much interesting history. There are two appendices, the first of surpassing interest, being "An Inquiry into the Effects of Ardent Spirits upon the Human Body and Mind," by Benjamin Rush, M.D., published in 1814; and the second, a summary of the Report of the Committee of Fifty, which made its studies between 1893 and 1903.

There is a short and interesting discussion of the use of euphorics, such as tea, coffee, chocolate, and certain other intoxicants; namely, the alkaloids. He holds that the comparison between alcohol and the alkaloids is not in the slightest degree overdrawn. This book is based on facts, and well worth reading and study. MAZYCK P. RAVENEL

Thinking About Marriage—By Roy A. Burkhart. New York: Association Press, 1935. 156 pp. Price, cloth, \$1.75, paper \$1.00.

This volume is a practical guide for the discussion of courtship and marriage with groups of young people. Every young person is absorbed by his thoughts on this subject and he gets surprisingly little sound guidance to support his natural high idealism. This author makes an objective approach which promotes thoughtful consideration. A skillful leader could bring to bear on such a group a large amount of biological and hygienic information.

This is a good example of the discussion group technic, a method which is seldom used by those in the field of public health. Wholesome sex behavior stands at the center of any effective program in venereal disease control and should not be overlooked by the sanitarian. If health officers generally would sponsor serious group thinking by young people under trained leadership we would have a fresh and constructive approach to this old problem. If someone is searching for a new idea in health education this fall this volume and the method which it proposes can be recommended.

REGINALD M. ATWATER

The Appraisal of Public Health Activities in Pittsburgh, Pennsylvania, 1930 and 1933—By Marian H. Ewalt and Ira V. Hiscock. Pittsburgh: Bureau of Social Agencies, Federation of Social Agencies of Pittsburgh and Allegheny County, 1935. 125 pp.

This appraisal of Pittsburgh's public health activities is an attempt on the part of the Federation of Social Agencies to provide a basis for better planning of community health organization and services. The appraisal was conducted under the auspices of a sponsoring committee of 21 represent-

ing all of the interested groups in the city. A committee of equal size was appointed by the Medical Society to assist and special committees to deal with such important functions as tuberculosis, maternity and child hygiene, and school hygiene were called into being.

The appraisal first orients the reader with the problems of population, climate, industries and economics of the community and then describes in considerable detail the organization and development of the public health program from 1929 through 1933 setting forth the interests of the many special agencies which participate to varying degrees in the local program. Chapters in the report are devoted to the discussion of the organization and conduct of services in each of the special fields pointing out problems and the present services and the needs. Specific and timely recommendations are made for the future conduct of the program in each field.

One is a bit surprised at the relative meagerness of the mortality and morbidity statistics, as one might expect in a city of this size reliable vital statistics would be available since early in this century. In a few instances, comparisons are made between figures for 1920, 1930 and 1933 of both cases and rates, which seem like meager data from which to draw conclusions.

The appraisal of services indicates that vital statistics, laboratory, acute communicable disease control, maternity hygiene, infant hygiene, general sanitation are all developed to 85 per cent or better. It is surprising to find that organized services for venereal disease supervision and control are practically lacking and that this is the weakest phase of the present public health program. Especially is this surprising since the state of Pennsylvania has had organized clinics in many counties.

The report sets up as special problems demanding attention the control of venereal infections, the development of a mental hygiene program, services for control of cancer and heart disease.

One looks at the end of the report for some general recommendations of the Federation as to the program which the community planned to follow in putting the findings of the survey and appraisal into effect. Apparently the Federation has not yet formulated any course of procedure. The conduct of

the appraisal, however, utilizing many groups of interested people in the city was no doubt planned to give them an intimate acquaintance with the problem and to fit them to carry on the responsibility of program planning.

It is believed that the report would be more thoroughly and extensively read if it had been printed with a type of a lighter face and the material had been less crowded on the page. One finds difficulty in reading it consistently for long periods. W. F. WALKER

BOOKS RECEIVED

THE MERCK MANUAL OF THERAPEUTICS AND MATERIA MEDICA: A Source of Ready Reference for the Physician. Compiled and Published by Merck & Co., Rahway, N. J. 1934. 1,379 pp. Price, \$2.00.

THE PHYSIOLOGY OF PHYSICAL EDUCATION FOR PHYSICAL EDUCATORS AND THEIR PUPILS. By Percy M. Dawson. Baltimore: Williams & Wilkins, 1935. 938 pp. Price, \$8.00.

CLINICAL PARASITOLOGY AND TROPICAL MEDICINE. By Damaso de Rivas. Philadelphia: Lea & Febiger, 1935. 367 pp. Price, \$5.00.

TEXTBOOK OF ATTENDANT NURSING. By Katharine Shepard and Charles H. Lawrence. New York: Macmillan, 1935. 433 pp. Price, \$3.00.

ELEMENTS OF STATISTICS. By Harold T. Davis and W. F. C. Nelson. Bloomington: Principia Press, 1935. 424 pp.

PNEUMONOKONIOSES (SILICOSIS) LITERATURE AND LAWS OF 1934. Compiled by Geo. G. Davis, Ella M. Salmonsens and Joseph L. Earlywine. Chicago: Chicago Medical Press, 1935. 490 pp. Price, \$10.00.

PUBLIC HEALTH ADMINISTRATION IN THE UNITED STATES. By Wilson G. Smilie. New York: Macmillan, 1935. 458 pp. Price, \$3.50.

PREVENTIVE MEDICINE AND HYGIENE. 6th ed. By Milton J. Rosenau. New York: Appleton-Century, 1935. 1,481 pp. Price, \$10.00.

DO'S AND DON'TS FOR HEALTH, HAPPINESS AND ABUNDANT LIFE. By John J. Sutter. Bluffton, O.: Bluffton News Printing & Publishing Co., 1935. 152 pp. Price, \$1.00.

NUTRITION OF MOTHER AND CHILD. 4th ed. By C. Ulysses Moore. Philadelphia: Lippincott, 1935. 258 pp. Price, \$2.00.

THE REFERENCE SHELF. VOL. 10, SOCIALIZATION OF MEDICINE. Compiled by Julia E. Johnsen. New York: Wilson, 1935. 335 pp. Price, \$.90.

ASYLUM. By William Seabrook. New York: Harcourt Brace, 1935. 263 pp. Price, \$2.00.

DERMATOLOGY AND SYPHILOLOGY FOR NURSES, INCLUDING SOCIAL HYGIENE. 2d ed. By John H. Stokes. Philadelphia: Saunders, 1935. 368 pp. Price, \$2.75.

A MARRIAGE MANUAL. By Hannah M. Stone and Abraham Stone. New York: Simon & Schuster, 1935. 334 pp. Price, \$2.50.

THE BOY WHO HAD NO BIRTHDAY. By Mabel Leigh Hunt. New York: Stokes, 1935. 259 pp. Price, \$1.75.

GENERAL BACTERIOLOGY. 11th ed. By Edwin O. Jordan. Philadelphia: Saunders, 1935. 825 pp. Price, \$6.00.

SEWAGE DISPOSAL: A MARKET PICTURE OF A RAPIDLY GROWING INDUSTRY. Obtainable from Municipal Sanitation, New York, N. Y.

FOOD AND BEVERAGE ANALYSES. By Milton Arlenden Bridges. Philadelphia: Lea and Febiger, 1935. 248 pp. Price, \$3.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Modified Prone Pressure Resuscitation—From France comes this modification of the Schafer method, requiring the services of two operators. Increased air intake is claimed for it.

ANON. Modified Schafer Method of Artificial Respiration. J.A.M.A. 105, 8:609 (Aug. 24), 1935.

Poliomyelitis Vaccine—Formalin inactivated poliomyelitis virus is probably a safe vaccine and begins to develop demonstrable antibodies in about a week. The authors conclude, conservatively, that only further study will show whether sufficient and permanent protection is given. It may be said, however, that the limited experience in the face of epidemics indicates the value of vaccination. In a second paper in this interesting symposium, one author discusses steps which led to the present position.

BRODIE, M., and PARK, W. H. Active Immunization Against Poliomyelitis. New York State J. Med. 35, 16:815 (Aug. 15), 1935.

Supervising Vitamin D Milks—Discussing the necessary regulations for vitamin D milk to insure that the customer gets what he pays for, the author suggests that minimum limits of vitamin D might be established, that periodic tests be made, but that no statement of the number of units contained should appear on the cap.

BROOKS, P. B. Vitamin D Milk Control. New York State J. Med. 25, 15:776 (Aug. 1), 1935.

Controlling Communicable Diseases—The present-day attitude toward control measures against measles,

whooping cough and scarlet fever are admirably expounded in this symposium. Not new, but good.

ELEY, R. C., *et al.* Symposium on the Control of Certain Communicable Diseases. New Eng. J. Med. 213, 5:195 (Aug. 1), 1935.

Immunizing Babies Against Diphtheria—Evanescence of immunity to diphtheria in infants interferes with the response to vaccination with toxoid. Therefore, immunization should not be done without a preliminary Schick test, is the conclusion of this paper.

GREENGARD, J., and BERNSTEIN, H. Passive Immunity in Infants and Their Response to Diphtheria Toxoid. J.A.M.A. 105, 5:341 (Aug. 3), 1935.

Scarlet Fever Immunization—Experience in Philadelphia in protecting children against scarlet fever leads the author to urge its more widespread use.

HENRY, J. N. A Study of Active Immunization Against Scarlet Fever. J.A.M.A. 105, 7:489 (Aug. 17), 1935.

Placental Extract and Measles—Immune globulin was found in this study to be of definite value in the treatment, modification and protection against measles.

LEVITAS, I. M. Treatment, Modification and Prevention of Measles by the Use of Immune Globulin (Human). J.A.M.A. 105, 7:493 (Aug. 17), 1935.

Preventing Rabies in a Large City—Discussing control measures applicable to New York City conditions, the author points out the difficulties in enforcing muzzling and leashing orders, and urges that owners be made responsible for bites by their dogs.

Persons bitten should receive compensation whether or not the dog proves to be rabid.

OLESEN, R. Control of Rabies in New York City. Pub. Health Rep. 50, 33:1087 (Aug. 16), 1935.

Who Was It Who Used To Talk About Depression Benefits?—Children in families whose income has fallen to a low level have suffered most in the recent economic depression. This is the conclusion of a study of relative changes in height and weight from 1929 to 1933 in children of families in various economic strata.

PALMER, C. E. Height and Weight of Children of the Depression Poor. Pub. Health Rep. 50, 33:1106 (Aug. 16), 1935.

Medical Practice and Public Hygiene—Recounting how the medical profession coöperated in the public health programs of Maryland's local health departments, the author urges the necessity for closer coöperation everywhere.

RILEY, R. H. Preventive Medicine. J.A.M.A. 105, 8:555 (Aug. 24), 1935.

Rules for Communicable Disease Control—This is the latest revision of the standard regulations for the administrative control of the communicable diseases usually required to be reported in the United States.

SUBCOMMITTEE ON COMMUNICABLE DISEASE CONTROL, COMMITTEE ON RESEARCH AND STANDARDS, AMERICAN PUBLIC HEALTH ASSOCIATION. The Control of Communicable Diseases. Pub. Health Rep. 50, 32:1017 (Aug. 9), 1935.

A Modified Death Rate—Willcox makes death rates for states more comparable by "standardizing" for sex, race, nativity, and age. As a result the ranks of the various states change greatly, and the "scatter" of the rates is reduced.

WILLCOX, W. F. An Improved Method of Measuring Public Health in the United States. *Revue de l'Inst. Int. de Statistique*, I, 1935, (reprint).

ASSOCIATION NEWS

THE ANNUAL MEETING

OCTOBER 7-10 will find many of the readers of the *Journal* in Milwaukee for the 64th Annual Meeting. Nearly 300 papers and reports are listed on the program. Those who will not have the good fortune to hear them personally are reminded that the best ones will appear in the *Journal* during the year, and that all committee

reports will appear in the Year Book.

Readers are urged to watch their local newspapers for announcements of radio programs originating at Milwaukee during the week beginning October 6. At least one of the several periods arranged will be over a national network while others will involve as many as thirty stations.

A WORD TO THE THRIFTY

VERY few of us, at any time, will entirely disregard an opportunity to reap a financial benefit from thrifty buying or from careful and calculated investments. Why, then, do A.P.H.A. Fellows continue to overlook the gain inherent in Life Membership? They should do so no longer.

A careful study of the chart on the reverse page will reveal the savings which will accrue to Fellows by taking Life Membership at various ages. For example, a Fellow applying for Life Membership at the age of 40 will save a little over \$75. This saving (three-quarters of the cost of Life Membership) is of such proportion as to warrant careful investigation.

Beside the straight economical benefits, others accrue to Life Members: (1) annual payment of bills is onerous to some—Life Membership eliminates that; (2) in times of low income, a Life Member is assured of his continuation in the Association, thereby safeguard-

ing for all time his professional standing; (3) a Life Member can pride himself on the high type of professional spirit he has shown by investing in the future of public health work.

Life Membership dues need not be paid at once—the payments may be spread over a year from the date of election, which takes place at each Annual Meeting.

Some may ask—What is done with the dues of Life Members? They are set up in a Life Membership Fund entirely separate from other Association funds, and only the interest therefrom is used to carry the cost of each Life Member's participation in Association activities.

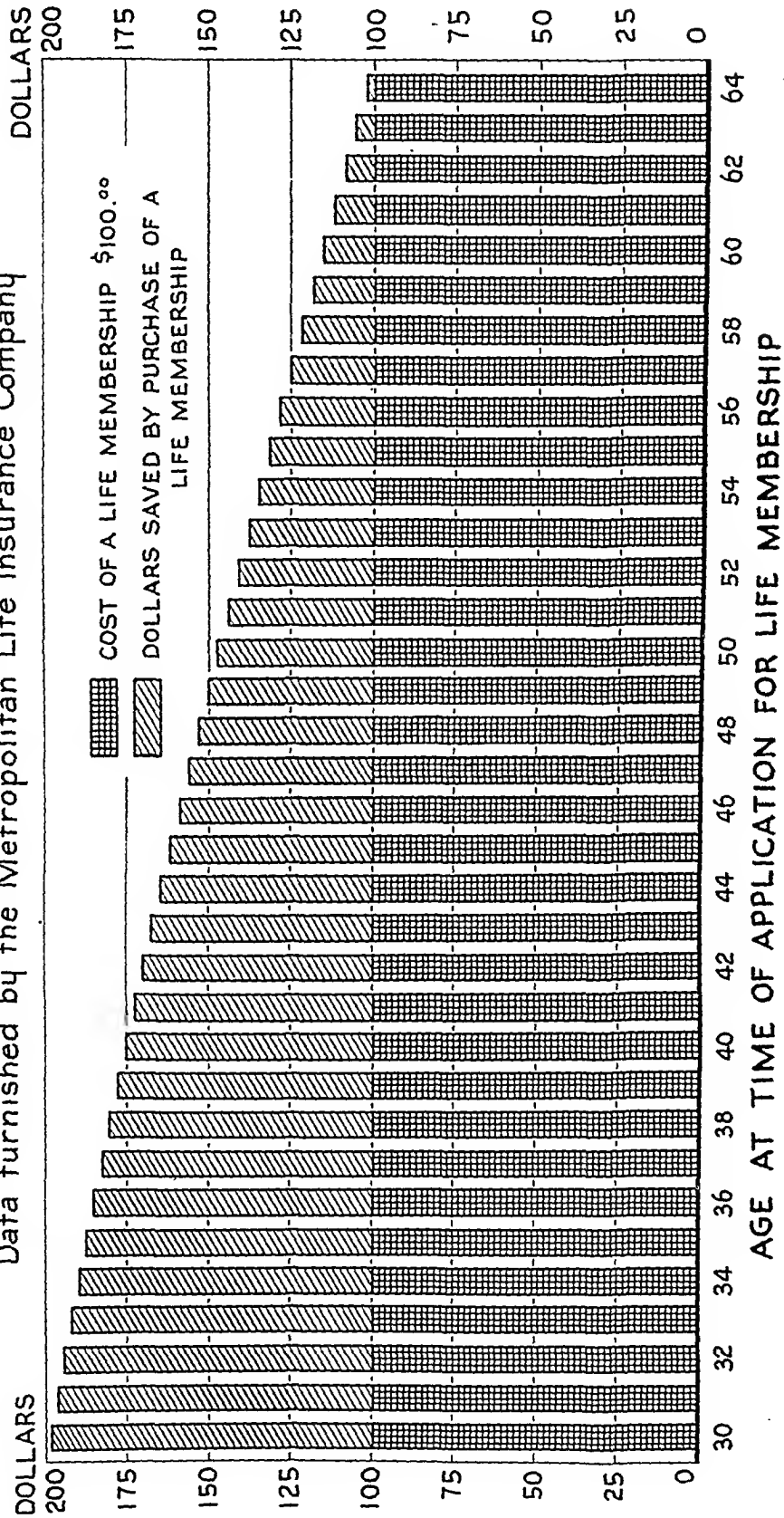
It must be obvious that the advantages of Life Membership far outweigh the disadvantages. The Committee on Fellowship and Membership, therefore, urges each and every Fellow to give serious thought to the desirability of applying for Life Membership.

DOLLARS SAVED BY THE PURCHASE OF A LIFE MEMBERSHIP

[In place of payment of annual dues]

IN THE AMERICAN PUBLIC HEALTH ASSOCIATION

Data furnished by the Metropolitan Life Insurance Company



APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

- Orville G. Brown, M.D., Dr.P.H., Balboa Heights, C. Z., Chief Health Officer, Panama Canal
- Frederick McD. Harkin, M.D., City Hall, Marquette, Mich., City Health Officer
- Wallace D. Hunt, M.D., 606 City County Building, Seattle, Wash., King County Health Officer
- F. Isabelle Kapp, M.D., M.S.P.H., 1459 Wythe Place, The Bronx, New York, N. Y., Director, Out-Patient Department, Lincoln Hospital
- Julian O. Long, M.D., Box 504, Belen, N. Mex., District Health Officer
- Charles Y. Moser, M.D., Terra Alta, W. Va., County Health Officer
- Dudley A. Reekie, M.D., Box 108, Somerset, Ky., Director, Pulaski County Health Department
- Alex B. Shipley, M.D., Tazewell, Tenn., Director, Claiborne-Grainger Health District
- H. H. Tuttle, M.D., Department of Public Health, Springfield, Ill., Superintendent of Health
- Dr. James S. Walton, 158 Guy Park Avenue, Amsterdam, N. Y., District State Health Officer

Laboratory Section

- Alexander M. Carr, M.D., Jamesburg, N. J., Medical Director, Applied Research Laboratories, Inc.
- Marcella J. Movius, B.A., 236 Hart-Albin Building, Billings, Mont., Laboratory Technician
- Royal C. Perkins, Ph.D., 201 N. El Molino, Pasadena, Calif., Laboratory Director, Biological Research Laboratories
- A. S. Rudolph, M.S., McKenzie, Tenn., Head, Department of Science, Bethel College
- Louis W. Sauer, M.D., Ph.D., 636 Church Street, Evanston, Ill., connected with Evanston Hospital
- Pauline Sterling, Grand Island Clinic, Grand Island, Nebr., Bacteriologist and Laboratory Technician

Vital Statistics Section

- Marian H. Ewalt, B.S., 519 Smithfield Street, Pittsburgh, Pa., Research Assistant, Bureau of Social Research, Federation of Social Agencies
- Margaret P. MacDonald, State Board of Health, Montgomery, Ala., Editor, Death Certificates

Isabel McCaffrey, A.B., Room 828, 50 W. 50 Street, New York, N. Y., Statistical Assistant, National Tuberculosis Association

Robert L. McLaren, State Department of Health, Des Moines, Ia., Director, Division of Vital Statistics

Gerda C. Pierson, 469 State Office Building, St. Paul, Minn., Director, Division of Vital Statistics, State Department of Health

Robert Riegel, Ph.D., University of Buffalo, Buffalo, N. Y., Director, Bureau of Business and Social Research

Public Health Engineering Section

George O. Pierce, State Department of Health, Minneapolis, Minn., Sanitary Engineer

Norman J. Radder, M.A., 35 E. Wacker Drive, Chicago, Ill., Secretary, Plumbing and Heating Industries Bureau

Henry W. Taylor, B.S., 11 Park Place, New York, N. Y., Consulting Sanitary Engineer

Industrial Hygiene Section

Edgar C. Barnes, B.S., Westinghouse Electric & Manufacturing Company, E. Pittsburgh, Pa., Industrial Hygiene

Leopold Brahdy, M.D., 1700 Municipal Building, New York, N. Y., Medical Expert, charge Workmen's Compensation of New York City

Richard B. L. Fleming, M.S., Hotel Webster Hall, Detroit, Mich., Industrial Health Conservancy Laboratories

Léonard J. Goldwater, M.D., 477 First Avenue, New York, N. Y., Chief, Occupational Disease Clinic, N. Y. University College of Medicine; Director, Student Health Service

Roy R. Jones, M.D., U. S. Public Health Service, Washington, D. C., Passed Assistant Surgeon, Office of Industrial Hygiene and Sanitation

Stuart F. Meek, M.D., 7900 Joseph Campau Avenue, Detroit, Mich., Director, Industrial Hygiene Department, Chrysler Corp.

Stephen E. Whiting, S.B., 1100 Park Square Building, Boston, Mass., Assistant Chief Engineer, Liberty Mutual Insurance Co.

John J. Wittmer, M.D., 4 Irving Place, New York, N. Y., Medical Director, Consolidated Gas Company of New York and Affiliated Companies

Food and Nutrition Section

James E. Fuller, Ph.D., Massachusetts State College, Amherst, Mass., Assistant Research Professor of Bacteriology, Massachusetts Experiment Station

Child Hygiene Section

Olive B. Cordua, M.D., 739-4th Avenue, San Diego, Calif., Director, Division of Child Hygiene, San Diego, City and County Health Department

Margaret Tyler, M.D., 195 Church Street, New Haven, Conn., Associate Professor, Obstetrics and Gynecology, Yale Medical School

Public Health Education Section

James M. Batchelor, M.D., City Board of Health, New Orleans, La., Superintendent of Public Health

Francisco M. Fernandez, M.D., 343 Ingraham Building, Miami, Fla., Secretary, Pan American Medical Association, Section on Ophthalmology

Catherine L. McAndrews, A.B., 2440 Lake View Avenue, Chicago, Ill., Assistant Executive Secretary, Good Teeth Council for Children, Inc.

Adrian Scolten, M.D., 690 Congress Street, Portland, Me., Practicing Physician

Public Health Nursing Section

Grace M. Coffman, Bureau of Public Health, Santa Fe, N. Mex., State Supervisor of Public Health Nursing

Gertrude M. Hock, R.N., General Hospital Building, Pontiac, Mich., Superintendent, Visiting Nurse Association

Portia G. Irick, R.N., 301 W. Monroe Street, Bloomington, Ill., Supervising Nurse, State Department of Health

Marie Klein, Route 3, Appleton, Wis., County Nurse

Frances C. Montgomery, R.N., 519 Dexter Avenue, Montgomery, Ala., Chief, Division of Public Health Nursing, State Department of Health

Epidemiology Section

Jean Downes, M.A., 40 Wall Street, New York, N. Y., Statistical Research Worker, Milbank Memorial Fund

John H. Korns, M.D., 615 W. Sullivan Street, Olean, N. Y., Director, Bureau of Tuberculosis, Cattaraugus County Department of Health

Robert E. Rock, M.D., State Department of Health, Minneapolis, Minn., Epidemiologist in charge of Venereal Disease Control, Division of Preventable Diseases

Unaffiliated

Roger A. Nolan, M.D., 814 Glorietta Boulevard, Coronado, Calif., Supervisor of Health of families of the officers and enlisted personnel, U. S. Navy

Alexander Ropchan, M.A., 203 N. Wabash Avenue, Chicago, Ill., Executive Secretary, Health Division, Council of Social Agencies of Chicago

DECEASED MEMBERS

C. A. Bevan, M.D., West Haven, Conn., Elected Member 1918, Fellow 1923

Professor John Weinzirl, Seattle, Wash., Elected Member 1906, Fellow 1922

F. F. DeVore, M.D., Toledo, O., Elected Member 1927

Frederick T. Fitch, M.D., East Hampton, Conn., Elected Member 1932

George R. Thompson, M.D., Luzerne, N. Y., Elected Member 1931

M. O. Heckard, M.D., Chicago, Ill., Elected Member 1907, Fellow 1922

C. St. Clair Drake, M.D., Jacksonville, Ill., Elected Member 1914

Francis C. Driscoll, A.B., Quincy, Mass., Elected Member 1934

Mrs. William L. Putnam, Boston, Mass., Elected Member 1915

VITAL STATISTICS DIRECTORY

THE first attempt, as far as we know, to compile a list of persons engaged in vital statistics work was undertaken this year by the Vital Statistics Section of the A.P.H.A. The Directory has been issued in mimeographed form and a copy has been sent to each member of the Vital Statistics Section.

It is believed that the directory will be useful as a source of reference in determining who's who in the field of vital statistics, and in stimulating and

promoting professional coöperation and loyalty to the American Public Health Association.

The directory should help to bring opportunities for recognition and advancement, particularly in the case of junior members of departments.

We will gladly furnish a copy to any member or Fellow of the Association who would like one. A charge of 50¢ per copy will be made to individuals not affiliated with the American Public Health Association.

NEWS FROM THE FIELD

ROYAL SANITARY INSTITUTE HEALTH CONGRESS AT BOURNEMOUTH

SANDOR HORWITZ, M.D., representing the Department of Health of the State of Illinois and the American Public Health Association at the Health Congress at Bournemouth, July 15-20, reports an attendance there of 1,084 delegates representing 23 foreign governments and authorities, 38 dominion and colonial governments and authorities, and 624 local authorities and educational institutions in Great Britain. In addition, there were 200 members and associates of the Royal Sanitary Institute in attendance excluding those appointed as delegates. Associates of the Congress and holders of guest tickets numbered 164.

At the Congress, 45 addresses and papers were read at fifteen meetings covering preventive medicine, architecture, town planning and engineering, maternity, child welfare and school hygiene, veterinary hygiene, national health insurance, hygiene in industry.

Special courtesies were extended to overseas delegates and a luncheon in their honor was held at the Royal Bath Hotel on Tuesday, July 16.

NEW HEALTH GROUP CREATED

PRESIDENT ROOSEVELT has created an interdepartmental committee to coördinate health and related welfare activities of the government, in line with the new Social Security Act. Saying in a formal statement that "there is increasing necessity for better coördination of the health activities of the Federal Government," Mr. Roosevelt named Josephine Roché, Assistant Secretary of the Treasury in charge of the Public Health Service; Oscar Chap-

man, Assistant Secretary of the Interior; M. L. Wilson, Assistant Secretary of Agriculture, and Arthur J. Altmeyer, Second Assistant Secretary of Labor.

The President's statement read:

In view of the passage and signing of the Social Security Bill there is increasing necessity for better coördination of the health activities of the Federal Government. I am, therefore, creating at this time an interdepartmental committee to give attention to this subject. As members of this committee I have appointed the following government officials: Josephine Roche, Assistant Secretary of the Treasury, chairman; Oscar Chapman, Assistant Secretary of the Interior; M. L. Wilson, Assistant Secretary of Agriculture, and A. J. Altmeyer, Second Assistant Secretary of Labor.

I am directing this committee to include within the scope of its work not only health activities, but closely related welfare activities as well. As its immediate task I am instructing this committee to assume responsibility for the appointment of special committees to be composed of physicians and other technically trained persons within the government service to study and make recommendations concerning specific aspects of the government's health activities.

I am confident that this procedure will facilitate the consummation of a series of appropriate coöperative agreements among the various departments of the government. I am also hopeful that in this way we can eventually bring about a complete coördination of the government's activities in the health field.

—*New York Times*, Aug. 16, 1935.

WHITE MICE FARM GIVEN GOVERNMENT

FORTY-FIVE acres of land in Maryland has been deeded to the U. S. Public Health Service by Mr. Luke Wilson, formerly of Evanston, Ill., for a white mice, rabbits and guinea pigs farm to facilitate research.

With the completion of some legal

formalities, it is stated that a \$100,000 Federal fund is available for constructing the first building.

RADIUM RESEARCH IN SWEDEN

THE battle against cancer in Sweden, which has already been aided by the million dollar jubilee fund subscribed at the time of the King of Sweden's 75th birthday, will now be further stimulated by a donation of 350,000 kroner (\$93,800) from a grateful patient at the Swedish Radium Home at Stockholm, the late Mrs. Maria Althainz. The income from the fund will be used for a professorship in radium therapy, the first holder of which will be Dr. Elis Berven, now chief physician at the Radium Home, founded by Dr. Gösta Forsell, the widely known radiologist.

Mrs. Althainz was successfully operated on at the Radium Home for a cancerous growth by Dr. Berven about six years ago. The cause of her death was not cancer.

The holder of the professorship should be free to devote his principal efforts to research, it is stipulated. The estate is to pay the inheritance taxes and the Swedish Government provide a pension. The Radium Home will be moved to new quarters at the Caroline Academy of Medicine in 1937, and there will be two divisions, one for medical radiology and one for radium therapy.

PHILADELPHIA CHILDREN IMMUNIZED

APPROXIMATELY nine thousand children under the age of 6 years were immunized against diphtheria in a campaign sponsored by the Philadelphia Department of Public Health in June.

In the last ten years the death rate from diphtheria in Philadelphia is said to have been reduced from 16.10 per hundred thousand of population to 1.09.

DR. GORDON TO STUDY SCARLET FEVER IN RUMANIA

JOHN E. GORDON, M.D., PH.D., of Detroit, member A.P.H.A., sailed September 21 from New York on an expedition to Rumania, where, in company with a staff of laboratory and field workers, he will undertake an extended study of scarlet fever.

For some months past Dr. Gordon has been working at the Rockefeller Institute for Medical Research in New York, studying special technics which may be applied to scarlet fever. Rumania has been chosen as the field for study because it lies in one of the very few portions of the world where scarlet fever still retains a high case fatality rate, deaths being in the vicinity of 10-20 per cent of the cases, in contrast to the average elsewhere of about 1 per cent.

It is significant that the health department of an American city thus reaches out to a remote part of the world for clues as to the cause of one of the more prevalent communicable diseases about which there has grown up much conflicting opinion and in which progress seems to have become arrested at a very incomplete level. It is understood that special attention will be centered on the cause of scarlet fever, with the possibility in mind that a parasite as yet undescribed may be discovered.

MISSISSIPPI ELECTS COUNTY OFFICERS

NEW County Health Officers in Mississippi are announced as follows:

- W. S. Martin, Carthage, Leake County
- William A. McMahan, Union, Newton County
- Albert P. Alexander, Como, Panola County
- George Lacey Biles, Sumner, Tallahatchie County
- Homer B. Watkins, Noxapater, Winston County
- Frank L. McGahey, Calhoun City, Calhoun County

SIR GEORGE NEWMAN HONORED

THE Medical Society of London presented the Fothergillian Gold Medal to Sir George Newman at its annual meeting, May 13.

Sir George, Honorary Fellow of the A.P.H.A., retired in March as Chief Officer of the British Ministry of Health and of the board of education. The medal is awarded by the Society every three years.

U. S. CHILDREN'S BUREAU DIVISION
HEAD APPOINTED

THE appointment of Ethel C. Dunham, M.D., to be Director of the Division of Maternal and Child Health of the Children's Bureau, U. S. Department of Labor, was announced by Katharine F. Lenroot, Chief of the Bureau.

Dr. Dunham, who has been on the Bureau staff since 1927, had been acting director of the division since December, 1934, when she was transferred to Washington from the Bureau's New Haven Branch. In New Haven she was engaged in original research and investigation on the medical aspects of neonatal mortality and morbidity.

Dr. Dunham succeeds Dr. Martha M. Eliot, who was promoted last December to be Assistant Chief of the Children's Bureau.—*Clearance*, Aug., 1935.

ANNA MARIA RHODA ERDMANN

PROFESSOR RHODA ERDMANN, Cancer Research worker, died August 24, at the age of 64. She was head of the Berlin Cancer Research Institute, founded by donations from the United States. She was the first German woman, it is stated, to lead a university institute independently.

She was a Professor, on the medical faculty, at the University of Berlin since 1922, and was the author of scientific books and articles.

MISSOURI PUBLIC HEALTH ASSOCIATION
MEETS

THE Missouri Public Health Association held its eleventh annual meeting in Kansas City, September 5-7.

Joseph F. Bredeck, M.D., D.P.H., Health Commissioner of St. Louis, member A.P.H.A., was inducted as President. Mrs. Elsbeth H. Vaughan, R.N., of St. Louis, F.A.P.H.A., was elected to represent the society on the Governing Council of the American Public Health Association. C. F. Adams, M.D., of Jefferson City, F.A.P.H.A., was reelected Secretary.

The meeting was well attended and leading health workers in the state participated.

Some of the speakers from outside the state were Dr. William DeKleine, of the American National Red Cross, Washington, D. C., F.A.P.H.A.; Eva F. MacDougall, R.N., of the Indiana State Division of Public Health, F.A.P.H.A.; Dr. Caroline Hedger, of the Elizabeth McCormick Memorial Fund; and Reginald M. Atwater, M.D., Executive Secretary of the American Public Health Association.

The 1936 Annual Meeting of the society will be held in Columbia, Mo.

AIR CONDITIONING SHOW

THE Fourth International Heating, and Ventilating Exposition, which is to be held January 27-31, 1936, in the International Amphitheatre in Chicago, Ill., is planned to be a pageant showing the advance of civilization in terms of the very air it breathes. Illustrated by means of the actual machines and processes in operation will be man's latest methods for the ultimate control of the weather in all seasons and climates.

The Exposition, which is held every two years, comes this year for the first time in Chicago. Previous expositions were held in Philadelphia, Cleveland, and New York.

NATIONAL ILLNESS SURVEY PLANNED

GEORGE ST. J. PERROTT, research associate of the Milbank Memorial Fund and statistician of the U. S. Public Health Service, will be the director of a national survey of chronic illness which is to be undertaken this fall with funds from the Works Progress Administration.

This health inventory is expected to yield information as to the extent to which ailments such as heart disease, rheumatism, diabetes, cancer, and digestive disturbances prevail in the United States, and the effect of such illnesses on economic and social conditions. The present study will later be correlated with data obtained previously by the Public Health Service in an intensive study of the importance and effect of chronic ailments on the capacity of the patient and family to remain self-supporting.

It is planned to obtain some of the necessary information from the records of hospitals and sick-benefit associations, and also to make a house-to-house canvass of 750,000 families in 19 states, selected as representative of the general population of various income levels. Besides chronic illness, data will be collected on physical disabilities, such as blindness, deafness, loss of limbs, or other crippling handicaps. In addition, an inventory will be made of the medical and nursing facilities available throughout the country, and information gathered as to the extent to which the canvassed population availed themselves of the existing public health and medical services.

The states to be included in the inventory are: Washington, Oregon, California, Utah, Minnesota, Missouri, Illinois, Michigan, Ohio, Pennsylvania, Maryland, Virginia, New York, New Jersey, Massachusetts, Georgia, Alabama, Louisiana, and Texas.—*News Digest of the Milbank Memorial Fund*, Sept., 1935.

WEIGHT REDUCER CAUSES BLINDNESS

BLINDNESS from the use of dinitrophenol for reducing weight has not stopped the use of the drug in spite of warning, says W. G. Campbell, Chief of the Federal Food and Drug Administration.

The eye cataracts observed in dinitrophenol poisoning develop with a rapidity and malignancy hitherto unknown, and result in total blindness within a comparatively short time. This drug may produce acute poisoning, followed by death.

The Food and Drugs Act, according to Mr. Campbell, is practically inoperative against this public health hazard. He says, "The only application of the law to these products is through some misstatement of fact or some false and fraudulent curative claim in the labeling. In any event, the law can be invoked only when the product has been transported across a state line."

TEXAS ASSOCIATION TO MEET

THE Texas Public Health Association will hold its Thirteenth Annual Meeting in Waco, Tex., October 16-18, at the Roosevelt Hotel.

Dr. B. E. Pickett, President of the association, plans what he hopes will be a worthwhile program.

WESTCHESTER HEALTH ASSOCIATION
INCORPORATED

INCORPORATION of the Westchester Tuberculosis and Public Health Association—at White Plains, N. Y.—was announced on September 14, "to facilitate the building up of relief funds of the organization."

James A. Tobey, Dr.P.H., of Rye, N. Y., F.A.P.H.A., who previously headed the association, has been elected President of the Corporation. Mrs. Susan W. Baker is Executive Secretary; and Edward M. Ames and James E. Bryan are Treasurer and Secretary respectively.

PERSONALS

OWEN E. PUCKETT, M.D., of Carlsbad, N. M., member A.P.H.A., has been appointed Health Officer of a district made up of Eddy, Lea, and Chaves Counties, N. M.

MICHAEL M. DAVIS, M.D., Director of Medical Services for the Julius Rosenwald Fund, Chicago, Ill., F.A.P.H.A., received the award of the Squires Prize for original investigation in the field of sociology. The award is made once every five years by Columbia University.

DR. FRANCIS W. HEAGEY, of Omaha, was elected President of the Nebraska Tuberculosis Association at the recent annual meeting.

DR. GAIL E. MILLER, of Lima, has been named Health Officer of Allen County, Ohio, on a part-time basis, to succeed Dr. John J. Sutter, member A.P.H.A., who served 16 years as full-time Health Officer.

DR. THOMAS E. GIBSON, of Mount Pleasant, Mich., has been appointed Health Officer of Genesee County, succeeding Leslie A. Lambert, M.D., of Flint, member A.P.H.A., resigned.

HAROLD JACKSON DAVIS, M.D., Assistant Director of Local Health Administration of the New York State Department of Health, Albany, N. Y., has been assigned as part-time consultant in medical care to the Works Progress Administration. Dr. Davis is a Fellow of the A.P.H.A.

HALBERT LOUIS DUNN, M.D., of Minneapolis, Minn., member A.P.H.A., has been appointed to the post of Chief Statistician in the Division of Vital Statistics of the U. S. Department of Commerce at Washington, D. C.

ALFRED D. GREGG, M.D., of Liberty, N. C., member A.P.H.A., has been appointed Health Officer of Edgecombe County, to succeed Dr. Rembert E. Broadway, of Tarboro, resigned. Dr. George H. Sumner, of

Asheboro, member A.P.H.A., has been appointed Health Officer of Randolph County, to succeed Dr. Gregg.

LESLIE T. WEBSTER, M.D., of the staff of the Rockefeller Institute for Medical Research, New York, member A.P.H.A., has recently received a prize of 1,000 Swiss francs awarded by the medical faculty of the University of Berne, Switzerland, in recognition of his work on encephalitis.

DR. PHILIP S. JOSEPH, of Alice, Tex., has been appointed Health Officer of Jim Wells County, to succeed the late Dr. John S. Strickland.

DR. BERNARD W. PATTON, of Lebanon, Tenn., was recently made Health Officer of Wilson County, to succeed William D. Cagle, M.D., member A.P.H.A.

DR. J. WILL PAYNE, of Willowood, has been appointed Health Officer of Lawrence County, Ohio.

DR. CLAY E. COBURN, of Kansas City, was elected President of the Kansas State Board of Health, at Topeka, Kans., recently.

DR. MURRAY C. EDDY, of Hays, has been named Health Officer of Ellis County, Kans.

DR. KENNETH H. COLLINS, of Craigmont, has been appointed physician and Health Officer of Lewis County, Idaho, succeeding Dr. Eli Taylor, resigned.

DR. FLOYD R. TOWN resigned recently as Health Officer of Jackson, Mich., after 16 years' service to become Health Commissioner of Isabella County.

DR. EDWARD A. SCHILZ, of Grand Ledge, Mich., has been appointed a member of the Michigan State Council of Health, to succeed Dr. William E. McNamara, of Lansing; and U. G. Rickert, D.D.S., of Ann Arbor, will succeed the late Chalmers J. Lyons, D.D.S.

DR. JESSE LYNN MAHAFFEY, of Had-donfield, N. J., was reelected Director of the New Jersey State Department of Health for four years. Dr. Irvin E. Deibert, of Camden, was elected President.

DR. CLARENCE H. WHITE, of Kenansville, N. C., has been named District Health Officer, with jurisdiction over the health boards of Avery, Yancey, and Watauga Counties.

CONFERENCES

- Sept. 30-Oct. 4, American Hospital Association, St. Louis, Mo.
- Sept. 30-Oct. 4, 21st National Recreation Congress, sponsored by the National Recreation Association, Chicago, Ill.
- Oct. 3-5, Association of Military Surgeons of the United States, New York, N. Y.
- Oct. 4, 5, Joint Meeting of the New England and New York State Sewage Works Associations, Schenectady, N. Y.
- Oct. 5, Round Table Conference of State Supervising Nurses, Milwaukee, Wis.
- Oct. 5-7, Conference of State Sanitary Engineers, Milwaukee, Wis.
- Oct. 7-10, Sixty-fourth Annual Meeting of the American Public Health Association, Milwaukee, Wis. Headquarters: Hotel Schroeder.
- Oct. 7-10, Annual Meeting of the American Association of School Physicians, Milwaukee, Wis.
- Oct. 7-10, Meeting of the American Association of State Registration Executives, Milwaukee, Wis.
- Oct. 7-10, Meeting of the International Society of Medical Health Officers, Milwaukee, Wis.
- Oct. 7-10, State Laboratory Directors Conference, Milwaukee, Wis.
- Oct. 7-10, Conference of Wisconsin Health Officers, Milwaukee, Wis.
- Oct. 8-11, Meeting of the Association of Dairy, Food and Drug Officials, Milwaukee, Wis.
- Oct. 10-11, Meeting of the International Association of Dairy and Milk Inspectors, Milwaukee, Wis.
- Oct. 12-19, Seventh Pan American Child Congress, Mexico City.
- Oct. 14-18, 24th Annual Safety Congress, National Safety Council, Inc., Louisville, Ky.
- Oct. 28-31, 18th Annual Meeting, American Dietetic Association, Cleveland, O.
- Nov. 1, Mid-Year Meeting of the New York State Association of Public Health Laboratories, at the State Laboratory, Albany, N. Y.
- Nov. 1, First Session of the Society of Illinois Bacteriologists, Chicago, Ill.
- Nov. 1, 2, School Health Conference, sponsored by the Department of School Health and Physical Education of the National Education Association, Philadelphia, Pa.
- Nov. 15, 16, Sixty-first Annual Meeting, New Jersey Health and Sanitary Association, Hotel Berkeley-Carteret, Asbury Park, N. J.
- Nov. 19, 20, Annual Meeting of the Southern Branch, American Public Health Association, St. Louis, Mo.
- Dec. 30-Jan. 4, 1936, Winter Meeting of the American Association for the Advancement of Science and Associated Societies, St. Louis, Mo.
- Jan. 27-31, 1936, Fourth International Heating and Ventilating Exposition, Chicago, Ill.
- Apr. 22-25, 1936, National Tuberculosis Association, New Orleans, La.
- May 11-15, 1936, American Medical Association Convention, Kansas City, Mo.
- July 27-31, 1936, Second International Congress on Mental Hygiene, Paris.
- Sept. 8-10, 1936, International Union Against Tuberculosis, Lisbon, Portugal.

American Journal of Public Health and THE NATION'S HEALTH

Volume 25

November, 1935

Number 11

Public Health at the Cross-roads^{*}

E. L. BISHOP, M.D., F.A.P.H.A. (*Life Member*)

*President of the American Public Health Association; Director of Health,
Tennessee Valley Authority, Knoxville, Tenn.*

THIS has been an eventful year in the history of the public health movement. For the first time the importance of public health protection as an element in national security has been fully recognized by expression of a national policy for the strengthening of state and local health agencies. Passage of the Social Security Act by the last Congress presents the public health profession of this country with the greatest opportunity to establish constructive programs of health service that has been given to any group in our history.

It is possible, under this policy and under appropriations already authorized though not yet made, to plan and execute a public health service, comprehensive in its organization, balanced in its programs, and relatively complete in its extent. As Dr. Ravenel has so pointedly emphasized, the American Public Health Association is the twin of modern preventive medicine, for both

came into being with the birth of our present conceptions of the spread and prevention of disease. Today, our twin has grown to man's estate and offers us a vast body of scientific knowledge to which both the natural and medical scientist constantly contribute added increments. For much of this knowledge, we, as yet, have found only incomplete facilities of application, but the chance of closing the gap between the acquisition and application of knowledge is at hand. I propose, tonight, that we rededicate ourselves to this purpose.

Epoch making as are the provisions of the Social Security Act in its shifting of our sense of values toward humanity and the conservation of vital resources, the country is to a very large degree prepared for them. For a generation the foundations and philanthropic institutions have carried on experimental work in public health administration, the training of personnel, and the development of proving grounds for teaching new principles and methods in the application of knowledge. This Association has, through its sections and

^{*} Presidential Address, delivered at the First General Session of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

standing committees, proved itself an invaluable instrumentality in the acquisition and interchange of information relative to public health procedure. No country of the world possesses a more able and efficient health agency than our own United States Public Health Service, and nowhere can be found more cordial relations than exist between this federal agency and the individual state agencies. Though local health organizations are yet limited in extent, the combined efforts of the voluntary and official health agencies of the country have established beyond reasonable doubt the principles governing local health administration. The present need is to secure the universal application of these principles.

Every state has recognized the place of public health in the governmental structure by the establishment of some form of state health organization. It is obvious, therefore, that there exists not only a knowledge of program and procedure through which much of our present information may be applied, but there is also available a partial structure of organization which needs only strengthening, extension, and expansion to provide equal opportunity of adequate health service for all the people.

The establishment of a national health policy through passage of the Social Security Act, together with the existence of at least the elementary facilities for the application of knowledge, today places the public health profession of this country at the crossroads of opportunity. If its fullest possibilities are to be realized, this turning point in our history must be met in the spirit of highest idealism. Therefore, I am encouraged to restate four fundamental objectives which have been the subjects of our discussions through many years, and in which we can now advance further in achievement than at any time since the organization of the Association.

Equal opportunity for adequate health service for all the people is a capital objective. In a country so vast as ours with unequal distribution of population, natural resources, governmental income, and health situations, it must be perfectly clear that at present little equity exists in the opportunity for the prevention of disease and the achievement of health. Many studies, familiar to most of us, show the wide disparity in the pressure of both common and regional health problems. Moreover, frequent observations show that the region with the smallest financial resources is confronted with the largest need for health service.

The second major objective, and one fundamental to economy and good administration, is the development of a fully balanced and correlated national plan of program and procedure, with each of the three elements of government (federal, state, and local) assuming full responsibility for the functions it is best situated to perform. There is no need for overlapping and duplication. The field is too broad, the responsibility too large, and the existing machinery of organization too inadequate for any agency to fail in assuming its specific duty or to assume duty for the performance of which it is not properly situated.

The third and possibly the most important of all objectives is the establishment of standards of recruitment, education, and training for personnel groups, since no service is better than the people who administer it, nor can knowledge be applied by those who do not possess it. Public health must be made a career service in which standards of ability and professional qualification constitute the exclusive basis of preferment.

The fourth objective is the extension of basic research in both the acquisition and the application of knowledge, in order that the frontiers of our factual

information may be advanced far beyond their present limits. As yet, we have only touched the fringe of potential values, and present research must not only be continued, but extended into new fields if we are to obtain progressive improvement of the methods and measures we use in our daily tasks.

All of these objectives can be realized under the public health provisions of the Social Security Act if we are capable of translating potentialities into action. The Act very specifically provides for

. . . assisting states, counties, health districts, and other political subdivisions of the states in establishing and maintaining adequate public health service, including the training of personnel for state and local health work.

It further provides for allocation of funds on a basis of population, special health problems, and financial needs of the respective states; for formulation of rules and regulations governing allocation of funds by the Surgeon General of the U. S. Public Health Service, after consultation with a Conference of the State and Territorial health officers; and for the such increased investigation of disease and of problems of sanitation as will make of the U. S. Public Health Service one of the great research institutions of the world.*

What are the essentials to successful action?

I believe the American Public Health Association has the chance to render a service at least equal to and perhaps exceeding that of any official agency. It is the professional association of public health workers. It guides very

largely the thinking of the varied groups of professionally and technically trained people included in its ranks. It holds in its membership the real leaders of the public health movement of the country, and it is an admirable medium for the ready exchange of knowledge concerning current practices, procedures, and research. It should be the efficient servant of all its members, and its present organization is such that its effectiveness is constantly increasing. It should, and undoubtedly will, consistently engage in such self-study and provide such expansion as will further increase its usefulness and prestige.

Through the work of its sections and standing committees, it has made large contributions to the advancement of public health practice in this country, but it has a still larger contribution to make. The excellent service the Committee on Administrative Practice has rendered in systematizing health programs, and promoting of better program balance must be continued and expanded where essential, for studies in this field are vital to improvement of methods.

The Committee on Research and Standards must be strengthened by the provision of increased funds, that the main committee and its sub-committees may form critical boards of review and evaluation, a function similar to that fulfilled by certain councils of the American Medical Association. This committee, operating under the handicap of practically no budget, has rendered a valuable service, but has developed as yet only a small fraction of its potentialities.

Perhaps the standing committee of most immediate importance is that on Professional Education. Here will be determined very largely whether or not we shall realize the major objective of standards of education and training through which we may facilitate the evolution of the public health work of

*I have deliberately refrained from discussion of other fundamental provisions of the Social Security Act including that part providing for the maternal and child hygiene service, work for crippled children, and others, for the reason that the whole matter is one for discussion at a Special Session of the present convention and my purpose is that of illustrating an opportunity rather than discussion of the Act.

the country into a career service. The committee has made a beginning, but only a beginning. The work already accomplished, however, enabled the Conference of State and Territorial Health Officers to formulate professional standards to guide the expansion of public health work organized under the Social Security Act. No more important service could have been rendered by this Association. It is true the work up to now is relatively superficial and general in character, but it is the beginning of a task hitherto left undone, and the committee can do for this Association what the very vital Council on Medical Education has accomplished for the American Medical Association. Progressive improvement of standards must continue if we are to deserve recognition as a group to which the judgment of professional qualifications can be partially delegated. Already in Great Britain

. . . professional qualifications are usually judged on the basis of membership in professional societies. Thus the selection of chief officers and professional and technical officers is delegated in part to a private professional organization. The theory is that professional qualifications can be better judged by the persons engaged in the profession than by any outside group.¹

The nation-wide program of training, provided by terms of the Social Security Act, will be far reaching and can accomplish much in the improvement of public health work. The present conditions of haphazard employment of untrained or inadequately trained personnel can be transformed into a system whereby individuals deliberately train for a career in the public health service of some unit of government and, ultimately, we may look forward to the time when such work constitutes a career service in the best and fullest sense of that term. This program of training will do more to exclude partizanship and consideration of political

expediency from public health organizations than all the statutes that might be written, for it insures a service which will win public esteem because of its merit. Such a statement requires no proof. We have already shining examples of its truth in our own U. S. Public Health Service and in many state and local organizations. It is a fundamental step forward not only in the betterment of the public health, but in the betterment of government itself, for it recognizes the principle of trained public servants for public service.

Added to the formulation of objectives and the establishment of guiding principles we shall have problems of organization. One of the most important of these is that of effective decentralization of service to the state and local health agencies, because a very fundamental policy, expressed in the public health title of the Social Security Act, is that of decentralization through the imposition of larger responsibility upon these agencies. We must be aware, however, that this carries with it an obligation to weld effectively the health service of all three elements of our government into a properly articulated whole. In this connection a resolution passed by the third annual convention of our Association in 1874 stands out as of exceeding interest. It provided that a committee consisting of a member from each state and territory of the Union be appointed to petition Congress at its next session to institute a Bureau of Health, located at Washington with a *branch at the seat of each state and territorial government*. A Bureau of Health has long since been created, but it seems to me rather fundamental to the success of our present efforts that well trained officers of the U. S. Public Health Service be made available to each state for consultation and field service in immediate program development, in personnel training and for as-

sistance in the planning of ultimate objectives.

Those of us who serve or have served as state health officials fully realize the value of such aid, and most of us could cite a number of examples in which it has resulted not only in shortening by a decade or more the period required for the development of effective organizations, but also in the planning of much better balanced and broader programs. Financial aid is not the only prerequisite of good work. Persons must translate money into accomplishment.

While all of our states have some form of state health organization, in many instances appropriations and personnel are insufficient to provide for even the most basic functions of a state health department. It is, however, in local health service that the most glaring deficiencies are shown, for of the more than 3,000 counties of this country, only 540 have provided even the foundations for whole-time health service, and some urban areas have organizations equal only to the most rudimentary requirements. It is in the state and local elements of our health machinery that the greatest structural weakness lies, and until these weaknesses are strengthened many sections of the country will be either partially or wholly without facilities through which the full values of present opportunities may be grasped. Individually and collectively we must exert our whole force in the effort to overcome these weaknesses. Hence a second organizational problem of extreme and immediate importance is that of closing these gaps through the establishment of properly organized health agencies where there are now no such agencies, and of increasing the adequacy of those which are inadequate.

As a group devoted to the service of humanity, we must become increasingly conscious that we are passing

through a renaissance of preventive medicine and public health, and that almost coincidentally with the birth of this Association, a new epoch began in the history of man's effort to survive the hazards of his environment and the menace of his fellow man. Our knowledge of the causative agents of disease, channels of infection, differential diagnosis, immunization and, even more important, the causes of good health, affords evidence that the human race fights a winning battle against the forces that would destroy it. This knowledge imposes upon us the responsibility of effecting a functional correlation wherever there is common interest and where administrative or organic union is inadvisable or impossible. The need of such correlation applies to all the categories of relationships—to the one governmental agency and another; to one professional group and others; to voluntary and professional associations—for all must, if they deserve survival and support, have the common objective of service to humanity.

Because of the greater importance of the immediate opportunity which the last Congress placed squarely before us as a responsibility, I have purposely refrained from detailed comment upon the affairs of the Association. There is, however, one point in connection with Association affairs which I should like to mention in conclusion.

I am sure you join me in holding for Dr. Kendall Emerson, our Executive Secretary for some years past, the deepest possible gratitude for his fine achievements in carrying the Association successfully through the most trying years since its organization, and that you, with me, have for him the most sincere affection. No human, however, could bear indefinitely the double burden of administering two great associations, especially with the problems of our Association so largely increased.

We are fortunate in having secured Dr. Reginald M. Atwater to continue, on a full-time basis, the fine service of Dr. Emerson. He, too, is a man we may all esteem for his fine attainments as an executive, a leader, and a friend.

Placing the secretaryship on a full-time basis could not have been done at a more opportune time in view of the importance of the work in relation to the matters considered throughout this discussion. I have every confidence that the affairs of the Association will prosper under his administration, and that it will meet its larger responsibilities with increasing effectiveness. In our support of his labors let us keep constantly in mind the statement of our first president, Dr. Stephen Smith, at

the Semicentennial Meeting in 1921:

May I be permitted reverently to suggest that our purpose has the same sentiment as was heard by the shepherds on the plains of Judea at the Nativity? Then the "good will to men" was announced to be the salvation of the soul from sin by divine appointment; while we now learn that salvation from the sins of the body must be effected by man himself, who created them.

Let us apply ourselves to the task with renewed vigor, and thus enable those who will greet the centennial anniversary of this Association to hear from sanitary officials the good news that the death rate of the year 1971 is limited to those afflicted with old age, or to disease or accidents unpreventable and incurable by any agencies known to science.

REFERENCE

1. Walker, Harvey. *Training Public Employees in Great Britain*, Monograph 6, Commission of Inquiry on Public Service Personnel, 1935.



**Protect Your Home
from Tuberculosis
BUY
CHRISTMAS SEALS**

Buy Christmas Seals

THE girl of the 1860's never heard of Christmas Seals. But she knew about "consumption." It was rampant. Her chance of getting it was three times greater than it is today. Tuberculosis still takes 50 per cent more girls than boys between 15 and 24. To help protect our modern girls against this disease the Christmas Seal must continue its program of education and prevention.—The National, State and Local Tuberculosis Associations of the United States.

Economic Health and Public Health Objectives*

JOSEPHINE ROCHE, LL.D.

*Assistant Secretary of the Treasury, in Charge of Public Health,
Washington, D. C.*

AS we now begin to emerge from our recent so-called period of "emergency," a few lasting lessons have been learned, we hope, by those of us interested primarily in the advancement of human welfare.

One of them, resulting from our coming to grips, as we have, with unprecedented human denials and suffering, is how completely interwoven and interdependent our various responsibilities are in changing the old order. We have long talked about our age of specialization—the field of education, of industry; the field of child welfare, of health; the problem of dependency, delinquency and crime—and now we realize that our various fields are but small lots, separated from each other only by imaginary lines, in one great general field where we must do joint battle for our common cause—conservation of our greatest national asset, our men, women, and children. We are at last conceiving a related program, one bringing into full recognition and participation all the lagging and neglected phases of human welfare. There has become a clearly defined recognition of this interrelationship of interests, of the necessity we are under to combine in a program of social action the best which extensive specialization along many lines can give.

We are realizing too that in the advance toward our common objective we must not permit defeats, even temporary, to occur through differences, however sincere, as to methods and means of reaching our goal. Surely we have had ample and painful proof of the way in which forces of reaction which would maintain the old order of privilege, go along together. They do not divide, and too often have "licked" us in the past because it is an outstanding characteristic of progressive, independent minded persons and groups to be sure their own particular way is best. And while we have debated ways and means, those clinging to the *status quo* of privilege for the few as against progress for the many, have crept up on us and circumvented us. Welding together all the varying points of view and the vital contributions that can come from all who have a common purpose into a solid and united front, is a very real challenge and fundamental responsibility we face today—one I think we can honestly say is being met with increasing effectiveness and intelligence. But we cannot slacken in our watchfulness and efforts to move forward with increasing coöperation and understanding. If eternal vigilance is the price of liberty, even more so is it the price of social progress.

We want to see full utilization of all our existing knowledge and tested methods of improving human conditions. We want to push forward, too,

* Read at the First General Session of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

the borders of that knowledge and learn how further conservation of human resources may take place, realizing as we do the needless and tragic wastes that are all about us.

One of the numerous constructive and important steps in this direction is of particular interest to this conference—the National Health Inventory now being conducted by the U. S. Public Health Service as a Works Progress Administration project, under the direction of Dr. L. R. Thompson and George St. J. Perrott of the Service, and made possible, as are so many valuable and lasting pieces of work today, by the tireless interest in and devotion to human welfare on the part of the Works Progress Administrator, Harry Hopkins.

Many of you are familiar with the plan and scope of the survey, but I would like briefly to discuss it here, not only because it needs your full understanding and interest, but also because of its direct bearing on, and contributions to, your own developing plans and responsibilities under the Social Security Act. The survey may be outlined under 5 heads:

1. An inventory of public health and medical facilities throughout the nation.
2. A survey of the extent and nature of disability from illness (including accidents), chronic diseases, and physical impairments, to be made in cities and rural areas in nineteen states. About 700,000 families are to be enumerated through a house-to-house survey in the 19 states. Some 6,000 persons will be employed in this canvass at its peak. The primary purpose of the survey is to secure, for a known population group, information on cases of illness attended by a physician and to obtain accurate statements as to diagnosis.
3. A measurement of the extent to which the health and medical facilities are actually used in different types of communities by persons suffering from various kinds of disabling illness and other physical or mental impairment.
4. The determination of sickness and mortality rates, according to occupation, based on reports of sick benefit associations.
5. A special survey to determine the inci-

dence of the communicable diseases, the frequency of immunizations, and the completeness of reports to health departments.

The scope and methods for the above parts of the whole project are as follows:

1. An inventory of public health and medical facilities supplementing information now available. These health facilities include public health agencies, both official and unofficial; medical facilities, including the distribution of physicians, hospitals, and institutions; and the number and distribution of public health nurses, nurses in private practice, and nurses employed by visiting nurse associations, public and private. All existing information will be utilized, such as the data already published by the American Medical Association, the American Hospital Association, and other agencies including the American Public Health Association. The new data will be collected only where and when it is needed in order to fill up gaps in the knowledge and inventory of health facilities. This phase of the work will be coördinated with the illness survey but will not involve the employment of relief personnel in securing the information.

2. The extent of disability from disease and accident with special relation to chronic conditions and impairments. In this, the coöperation of the medical profession is necessary in order to supplement the enumeration of surveyed populations and of disability by technical information on the nature of disabling illness among those who have been attended by physicians.

Although recent morbidity studies have thrown light on the problem of chronic diseases and physical impairment, the data are not extensive enough or specific enough to give an adequate picture of the situation; hence it is proposed that in the 19 states sample groups of families in different types of communities should be canvassed for this purpose, utilizing carefully selected enumerators under the direction of trained supervisors.

It may be stated as a basic principle of the study that no phase of the project involves a duplication of already existing material. The study is being undertaken because present information, especially that dealing with

chronic disabling illness, is inadequate.

The survey follows closely the well established policy of the Public Health Service and essentially employs methods which have long been used by the Service. It is a continuation of activities which have been carried on for some time—in certain aspects over a period of nearly 20 years.

The goal of the survey is to develop facts that will eventually provide human beings with greater security against the hazards of disabling illness. Modern preventive medicine has made great strides in increasing our security against early death as evidenced by the fact that the expectancy of life has increased from about 40 years in 1870, to 60 years in 1935. This gain has been largely due to the prevention and control of the communicable diseases. It is now proposed to study the causes of chronic illnesses and disabilities which usually appear after middle age and which are so intimately associated with the economic and social status and habits of the people.

The survey provides national recognition of the fact that the health service of the future will probably be expanded to cover other fields than the control and prevention of the communicable diseases. With the coöperation of the medical profession, the control, prevention, and cure of all the ills of the flesh must be the ultimate goal of the health department.

Few of us realize what the presence of a serious or long-standing chronic illness in a household means as to the ability of the family to maintain itself on a self-supporting basis and procure the needed medical care. In fact, we cannot say from our present store of information how many families or individuals are afflicted with some serious chronic disease or impairment which results in partial or complete economic disability.

The survey will undoubtedly reveal

that inadequate medical care is being received by families in the lower income groups and those on relief rolls. These under-privileged families have the greatest need of adequate care because of the high rate of disabling illness and impairment among them. A recent survey made by the Public Health Service in 10 cities showed that the disabling illness rate was 56 per cent higher among families hardest hit by the depression than it was among their more fortunate neighbors, and it showed too that these "new poor" received only about one-half the volume of physician's care that the comfortable group obtained. The discrepancy would have been even greater except for the large volume of free care received by the poor group.

Free service included service free to the family because paid for by state or local government as well as service given free by the physician. It is becoming widely recognized that physicians and hospitals cannot be expected indefinitely to render service to the indigent without remuneration, and that there must be public responsibility for the medical care of these unfortunates who otherwise must depend upon the charity of physicians. The health survey will provide information as to the amount of disabling illness among these people and the volume of medical services now being received, and will give for the first time an accurate picture of the needs both of relief clients and the large group of the "medically indigent" who are able to subsist but unable to finance a serious illness.

It is not necessary to describe to this conference the intimate and immediate effect on public health objectives of a period of economic depression such as we have been going through. Nowhere is sharp curtailment in expenditure more quickly felt in such times than in the public health field. The experience of

cities in 1934 shows that health budgets were reduced on the average about 20 per cent from the experience in 1931, reductions varying from 1 or 2 per cent to as high as 50 per cent. Where this reduction amounted to 30 per cent or more a practically complete breakdown of the public health protective facilities resulted.

On every side you who were daily and hourly in touch with the general widespread want, insecurity, and suffering translated into individual, concrete terms could bear testimony—and did—as to the appalling human deficit which we were piling up. The acute conditions of these recent years have revealed to us, however, how utterly inadequate provisions for health were even in those years glamorously referred to as the time of amazing prosperity.

In that peak year of our American material greatness, 1929, the people of the United States spent \$3,656,000,000 for all forms of medical care, including those services purchased directly through taxes and other community funds. This is approximately \$30 per capita per year, and in 1929 constituted about 4 per cent of the money income of the country. Certainly this expenditure could not be considered excessive for the population as a whole in view of the national expenditures in 1929 for tobacco, toilet articles, and recreation (\$5,807,000,000) or for automobile use and other travel (\$9,475,000,000). The proportion of the medical dollar which was spent for public health in 1929 was 3.3 cents.

Last week in Albany, at the conference on crime called by Governor Lehman, it was reported that our annual national crime bill is 14 billion dollars, about one-fourth the national income.

Other facts as significant and fundamental as these should be foremost in the mind of every one of us. In this

same year of 1929, at the peak of the stockmarket boom, the average per capita income of all salaried employees at work was only \$1,475. Eighteen million gainfully employed persons, constituting 44 per cent of all those gainfully occupied, exclusive of farmers, had annual earnings of less than \$1,000; 28,000,000, or nearly 70 per cent, earnings of less than \$1,500. Many people lived in straitened circumstances at the height of prosperity; a considerable number lived in chronic want. Throughout the 20's, the number of people dependent upon private and public charity steadily increased. At least one-third of all our people, upon reaching old age, are dependent upon others for support. Less than 10 per cent leave an estate upon death sufficiently large to be probated. These are but a few of the facts showing widespread social inequality reported by the President's Cabinet Committee on Economic Security.

By the end of the 1920's this want, dependency, and insecurity had reached a climax; had attained, one might say, such a high visibility that no one could longer be blind to its existence. We were shocked out of our long habit of complacency about ourselves and our general well-being, so much so that the impact of what we saw drove us to what we might call a defense terminology—we called what we saw an "emergency" situation. The millions of hungry, jobless men, the millions of undernourished children, the break-up of countless homes, and the breakdown of morale of countless citizens—we considered things suddenly emerging upon us out of an unpredictable catastrophe. But now, as the crest of the wave which broke over us diminishes and we see everywhere about us the acuteness of human suffering being lessened, as we see signs of conservation and building replacing waste and destruction, we realize more and more keenly

that a callous ignorance of, or indifference to, public affairs on the part of our citizenship was one of the chief factors in our social disaster, and that it cannot be tolerated in a progressive democracy.

So we come to a second important lesson we have learned, or are learning—that to a far greater extent, and with more vigor and alertness than ever before, we must function as citizens in public affairs, as well as specialists in our chosen work. There can be no progress except as it is the progress of all; no security unless there is general security; no enduring prosperity for any small or privileged group except as prosperity on a constantly widening and deepening base is built. Our own aims and dreams of achievement in specialized fields will come true only as we join with minds and hearts in the battle to make our country the thing our forefathers envisioned it to be, a place of equal opportunity to all and special privilege to none.

Twenty-four centuries ago, in another democracy, that of Athens, one of the greatest statesmen, Pericles, voiced a conception of a people's state which closely parallels our own. Above all, he emphasized the utter uselessness to Greece of citizens who did not participate in public life. His words hold much suggestiveness for us today.

With full appreciation of the heavy and unending tasks this challenge calls us to, we can in all honesty feel that we are on the rising trail, that we can look to an immediate future safeguarded, as the present is not, against certain devastating insecurities which individuals in our complex, highly organized state are powerless to cope with. Unless there is social security for the great mass as well as for the few, then our liberty is little less than mockery. We know that we have written into the law of our land the principle that human welfare, hu-

man conservation, is definitely a charge on government, and that in the time to come men and women shall not be broken in spirit and made a social liability because of their advancing years or inability to get work. The terror of dependent old age and involuntary idleness is to be, we have pledged, to some extent at least, lifted from our citizenship.

The youth of today, by whose minds and hearts and hands tomorrow's future will be shaped, we have declared must not have their most impressionable and important years dominated by inadequacies both physical and spiritual. Nine million children knowing only relief homes have made up 40 per cent of the total relief load these recent years. They have not been having the sort of chance we pride ourselves all American children are entitled to. So we have, as an organized society, pledged ourselves to ways and means by which their fathers may have guarantees of their right to participate, through free organization, in our industrial development, guarantees that decent wages and working conditions may reestablish the American home. We have taken our stand against the needless and preventable loss of life and health costing now in money terms some 2½ billions a year. We have outlined and ratified, as a people, measures to overcome these wastes and to establish through national, state, and local coöperation, policies of conservation in their stead.

We are "on our way"—forward; but the knowledge that we are, must serve only to make us more vigilant to safeguard gains which have been made, and more aggressively determined to continue our advance against waste and special privilege, and to stand up to be counted among the forces seeking to conserve human life and human happiness.

The Social Security Act in Its Relation to Public Health*

C. E. WALLER, M.D., F.A.P.H.A.

Assistant Surgeon General, United States Public Health Service, Washington, D. C.

IN an address made during the early part of his present term, President Roosevelt, in discussing his program for economic recovery, said: "Among our objectives I place the security of the men, women, and children of the Nation first." With a view to devising a sound plan for a program directed toward this objective the President later appointed the Committee on Economic Security to study the social and economic conditions which affect individual security. The Economic Security Bill, which eventually was enacted into law as the Social Security Act, was based upon the recommendations of this committee formulated in the course of its studies over a period of several months.

The general title of the Social Security Act approved by the President on August 14, 1935, sets forth the purpose of the Act as follows:

To provide for the general welfare by establishing a system of federal old-age benefits, and by enabling the several states to make more adequate provision for aged persons, dependent and crippled children, maternal and child welfare, public health, and the administration of their unemployment compensation laws; to establish a Social Security Board; to raise revenue; and for other purposes.

Specifically the Act provides for federal old-age benefits; for grants to the states for old-age assistance, unemploy-

ment compensation administration, aid to dependent children, aid to the blind, and maternal and child welfare; and for public health work, including the authorization of grants to states for aid in the development and maintenance of state and local health services and an annual appropriation to the Public Health Service for additional research activities.

Grants to the states authorized for maternal and child welfare include assistance in the maintenance of maternal and child health services, care of crippled children, child welfare services, and vocational rehabilitation.

For the administration of grants-in-aid features of the Act relating to old-age assistance, unemployment compensation, and aid to dependent children and the blind, the Act created a Social Security Board. The Children's Bureau of the Department of Labor is charged with responsibility for administration of grants for maternal and child health services, care of crippled children, and child welfare services; the Office of Education of the Department of Interior will deal with federal aid for vocational rehabilitation, and the Public Health Service will administer the grants to states for aid in establishing and maintaining state and local health services.

It is to be assumed that every feature of the Social Security Act will have some relation, either directly or indirectly, to the public health. Certainly the greater feeling of economic security

* Read before a Special Session under the auspices of the Health Officers Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

to be experienced by the wage earner and the individual looking forward to old age should contribute in some measure to better mental health; and it seems reasonable to believe that relief from want and deprivation in childhood and in the time of unemployment should lessen, to some extent at least, the hazards of disease resulting from lack of proper nutrition and the lack of means of providing at least some medical care. However, I take it that you are interested at this time chiefly in the provisions of the Act that deal specifically with health activities.

Under the Public Health Work Title of the Act authority is granted for:

1. An annual appropriation of not to exceed \$8,000,000 for the purpose of assisting states, counties, and health districts and other political subdivisions of the states in the establishment and maintenance of adequate health services, including the training of personnel for state and local health work.

2. An annual appropriation of not to exceed \$2,000,000 to the Public Health Service for research activities of the Service and for the expense of coöperation with the states in the administration of the federal funds to be granted for aid in the establishment and maintenance of state and local health services.

' Responsibility for allotment of the proposed appropriation of \$8,000,000 for state and local health services is placed upon the Surgeon General of the Public Health Service. In making the allotments to the states, however, the Surgeon General must take into account certain major factors; namely, the relationship of the population of each state to the total population of the United States as a whole; the financial needs of certain states, or the inability of the states to meet their health problems without financial assistance; and special health problems imposing unusual burdens upon certain states. The weighting and application of these factors in the distribution of the fund will be in the discretion of the Surgeon General, subject to the approval of the

Secretary of the Treasury. It should be noted particularly that the allotments are to be made to the states and that the Public Health Service cannot deal with local authorities either in the distribution of the fund or in the consideration of plans for the work.

The entire appropriation for aid to states each year must be allotted at the beginning of the federal fiscal year. However, the fact that an allotment has been made to each state will not necessarily mean that each state actually will receive the full amount of its *allotment*. The Act provides that *payments* to the states from allotments shall be determined by the Surgeon General, subject to approval by the Secretary of the Treasury, in accordance with regulations previously prescribed by the Surgeon General after consultation with a conference of the State and Territorial Health Authorities. Once funds have been allotted and paid to any state, they must be expended solely for the establishment and maintenance of health services and in accordance with plans presented by the health authority of such state and approved by the Surgeon General.

In anticipation of the enactment of the Social Security Act before the close of the latest session of the Congress, the Surgeon General laid before the Annual Conference of State and Territorial Health Officers with the Public Health Service held in Washington on June 17, 18, and 19, a suggested program which might serve as a basis for regulations to be promulgated by the Surgeon General governing the conditions under which payments from allotments would be made to the states. This program, with some modification in respect of details, was approved by the Conference and recommended to the Surgeon General for adoption.

With respect to general objectives of the program and plans for organization of the work to be carried out by the

states with the financial aid expected under the provisions of the Social Security Act, the report approved by the Conference of State and Territorial Health Officers contained in part the following recommendations:

It is the aim of the Economic Security Act, among other purposes, to stimulate a comprehensive, nation-wide program of public health, financially and technically aided by the federal government, but supported, so far as possible, and administered by states and local communities.

The \$8,000,000 annually appropriated for aid to states will be available for the following purposes:

1. Aid to state and territorial health departments for strengthening the service divisions and in providing adequate facilities especially for the promotion and administrative guidance of full-time city, county, and district health service.

2. Aid through state and territorial health departments for the development of city, county, and district health departments.

3. Training of public health personnel.

However, no state or territory should be eligible for aid unless and until it shall have provided or provides in its proposed plan for certain essentials of health organization hereinafter set forth.

Grants in aid to existing state or local projects should be supplemental to funds now being expended, and in no case should be used to replace existing state or local appropriations to such projects for the purpose of relieving state or local authorities from expenditures now being made.

Although it is recognized that many state and territorial health departments conduct a number of important specialized activities, for the purpose of allocation of funds under this Act, no state or territorial health department should be regarded as properly organized which does not provide as a minimum on a full-time basis the services listed below:

- a. A qualified full-time state or territorial health officer.
- b. Adequate provision for the administrative guidance of local health services.
- c. An acceptable vital statistics service. This should include an approved plan for the registration of births and deaths and the prompt forwarding of information relative thereto to the Public Health Service.
- d. An acceptable state public health laboratory service.
- e. Adequate services for study, promotion,

and supervision of maternal and child health.

- f. Special services for the study, promotion and guidance of local activities for the control of preventable diseases and for health promotion. This should include an approved plan for the collection of reports of notifiable diseases and the prompt forwarding of information relative thereto to the Public Health Service.

- g. Services for study, promotion and supervision of environmental sanitation.

Provided: that exceptions to this requirement may be made where it shall be determined by the Surgeon General that one or more of these services are uneconomical or unprofitable in a given state.

Existing deficiencies in minimum essentials of organization at least temporarily may be supplied through coöperative budgets developed with the use of allocated funds, provided that the amount used in such development of essential services does not exceed 20 per cent of the funds available from federal sources to be allocated to such state or territory. Provided, further, that funds allocated by the Public Health Service may be used in the building up of these essential services beyond the point of minimum requirements, particularly for the stimulation and supervision of local health service in accordance with the provisions hereinafter set forth and acceptable to the Public Health Service.

Subject to these requirements, the U. S. Public Health Service should consider expenditures proposed by a state for any health activity on which the state health agency now expends state funds or is authorized by law to expend such funds; the U. S. Public Health Service should reserve the right, however, to disapprove any proposed project or to decrease any item of proposed expenditure if in its opinion the purposes of the Act would be better attained thereby.

The basis of a satisfactory local health service is a well organized health department, adequately financed, with trained personnel, supported by suitable laws and ordinances, by favorable public opinion, and by all professional groups. To this end financial aid is to be granted, through the state and territorial health departments, toward the development and maintenance of adequate city, county, and district health organizations.

Allotments of funds should be made toward the establishment or maintenance of city, county, or district health services only when the following basic principles of organization and services in a community are met:

1. The public health services of the city, county, or district shall be under the direction of a whole-time health officer.

2. The personnel of the city, county, or district health department should include, in addition to the full-time health officer, such medical assistants, public health nurses, sanitation officers, and clerks as will insure at least a minimum of effective health service commensurate with the population and health problems of the area concerned.

The U. S. Public Health Service in its allocation to states should strive to foster the development of health units having a minimum personnel of one full-time health officer, two nurses, one sanitary officer and one clerk. When a district health unit comprises more than one county or parts of counties there should be at least one public health nurse and one clerk for each county or similar political unit of government embraced in the health district. In areas whose economic status does not justify this desired minimum the U. S. Public Health Service may feel free to modify these standards.

Personnel inclusive of health officers, nurses, sanitation officers, sanitary engineers, and other public health personnel employed under these grants-in-aid should meet the standards of qualifications established and recommended by the Conference of State and Territorial Health Officers.

The success of the Economic Security Act in the field of public health will depend upon the availability and employment of competent and professionally trained personnel. It is therefore recommended that funds be allocated to the states to assist in developing trained personnel for positions to be established for the extension of state, city, county, and district health organizations, and that minimum qualification standards for the necessary personnel be adopted by the Conference of State and Territorial Health Officers to serve as one of the conditions upon which the federal funds provided in this Act shall be allocated to the states for state and local health services.

The Conference at the same time prepared and recommended a standard of technical qualifications for public health personnel; recommended the setting aside of a special sum to be distributed among the states for the training of personnel as a part of the allotment to each state; suggested a procedure for the establishment of regional training centers for short courses to meet im-

mediate personnel needs; and set up a committee to consider and prepare standard record systems and report forms for the use of state and local health authorities.

In formulating qualification standards a special committee of the Conference followed closely the report of the Committee on Professional Education of the American Public Health Association.

In preparation for carrying out the provisions of the Public Health Title of the Act when the first appropriation becomes available, the Public Health Service has drafted and submitted to the Secretary of the Treasury for approval proposed regulations governing the allotments and payments to be made to the states. It is anticipated that these regulations will be passed upon by the Secretary within a few days. While they cannot, for obvious reasons, be discussed in detail at this time, it may be said that the draft submitted to the Secretary is substantially in conformity with the recommendations of the Conference of State and Territorial Health Officers so far as general policies may be concerned. In brief, these proposed regulations set up the amounts of the state aid appropriation to be set aside for allotment on the basis of population, financial need, and special health problems, respectively, through the weighting and application of these factors; provide for the matching of certain portions of the allotments with existing and new state or local appropriations as a condition upon which payments from allotments shall be made; require the submission of plans to be approved by the Surgeon General prior to the certification of the payments; require the submission of budgets to show the extent of state or local participation in support of the work; and call for periodic financial and statistical reports to show the expendi-

tures made from all sources as well as a brief summary of the progress of the work.

While the Public Health Service, realizing the desirability of preserving the independence of the states in matters affecting public health wholly within their boundaries, will not lay down rigid requirements with respect to either organization or qualifications of personnel, it will require that the general plan submitted by each state shall provide for efficient administration and sound expenditure of the funds. The Public Health Service will also recommend to the several states the plans of organization for state and local health services and the standards of qualifications of personnel recommended by the Conference of State and Territorial Health Officers.

THE TRAINING OF PUBLIC HEALTH PERSONNEL UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

Manifestly if public health work is to meet successfully the constantly changing demands there must be, first of all, aims and objectives that are practical, reasonably susceptible of achievement, and productive of results. Moreover, there must be a willingness to adjust principles to meet the newer conceptions of what is required. Obviously it is upon the public health worker, whether he be the state or local health officer or other member of the staff, that the burden of successful effort rests.

There has been a great deal of undesirable and unnecessary unrest among the personnel of health departments. In many organizations, whether state or local, there have been disturbing changes of personnel. In some instances, due to political expediency, competent workers have been unceremoniously dismissed while incompetent individuals have been retained. Only too often the funds for the maintenance of

efficient health services have been curtailed or withdrawn as the first rather than the final step in an economy program. Needless to say, such interference with plans and personnel has created an impression that public health work is a semi-permanent activity of dubious value that may be turned off and on like a controlled stream of water. The time is now at hand for removing permanently the hindrance to an enlightened and progressive public health viewpoint. In no way can this be better done than by assuring adequate salaries, undisturbed tenure of office for competent persons, and sufficient training to insure efficient service. The belief may be expressed that when public health workers become proficient in their professions through proper academic and practical training that commensurate salaries and prolonged tenure of office will follow as a matter of course. A health department should be an integral part of the local government, on an equal footing with school, justice, and police administrations. The opportunity offered for the training of public health personnel under the provisions of the Social Security Act will undoubtedly aid in attaining the objectives just mentioned.

Public health work should be a profession, as clearly defined as that of law, medicine, engineering, pedagogy, or other specialties. Moreover, a public health career should be as attractive, lucrative, and permanent as any other professional field. While the opportunities for financial advancement may not be as promising as elsewhere, there is always the prospect of affording service to humanity, through the prevention of unnecessary illness and premature death.

Recognizing that the training of public health personnel is a pivot around which the health provisions of the Social Security Act revolves, the Conference of State and Territorial Health

Officers, which met with the Public Health Service in June, 1935, devoted a goodly share of its attention to this phase of the subject.

The Conference recommended that \$1,200,000, or 15 per cent of the proposed \$8,000,000 annual appropriation, be set aside for the prompt development of qualified personnel designed to strengthen and enlarge the staffs of state and local health departments. In furthering these objectives it was recommended that the Public Health Service proceed to develop suitable training centers at existing institutions, conveniently located to serve certain groups of states, and that the cost of aiding these institutions where necessary be prorated among the states to be served by the proposed centers. Furthermore, it was suggested that funds be granted to the several state departments of health in accordance with their needs, as certified by the state health officers, for the purpose of paying living stipends, tuition, and traveling expenses of trainees who would be selected by the state health officers for attendance upon courses to be given at the training centers.

It is desired to emphasize that selections of public health trainees are to be made by state departments of health and not by the Public Health Service. Moreover, it is expected that positions will be provided in state and local health departments for those who have satisfactorily completed the course of training. Therefore, it is essential that the nominations of trainees be correlated with the plans and financial resources of each of the state departments of health.

So far as may be practicable it is the intention to utilize existing public health training centers. However, when necessary, the establishment of new facilities for public health training in existing institutions will be encouraged. It is planned to establish

training facilities as they may be needed to meet the demand created by the state departments of health, *i.e.*, the number and kind of trainees will be determined by the state departments of health, and the facilities will be adjusted to the demand for service. In the beginning attention will be given chiefly to the development of facilities for short courses to meet the emergency need.

Provision will also be made for a center in which Negro nurses may secure public health training. While the location and facilities to be provided will depend upon the number of nurses nominated for training, it is expected that a number of state departments of health, especially those having large Negro populations, will take advantage of this opportunity.

To provide for additional field training after instruction at the training center has been completed, funds will be available for augmenting the staff of a local health unit selected by the health officer in each state to serve as a field demonstration station.

The rather sudden and rapid expansion of public health work contemplated under the provisions of the Social Security Act will create an immediate demand for considerably more personnel than is at present available. Therefore, it becomes necessary to consider the length and content of training courses that should be offered. Many of the established schools of public health feel that their paramount duty is toward students taking regular and full courses of instruction. However, in view of the necessity for training a considerable number of workers within a comparatively short space of time the establishment of short courses has received considerable attention. In general it is believed that 2 months of systematic instruction should be regarded as a minimum. An additional month of apprenticeship under a well

trained and experienced health officer, preferably in the state in which the trainee expects to work, should be provided. It should be possible for a student taking a short course to receive credit which can be utilized in securing a certificate or degree when further instruction is taken.

While there may be some difference of opinion regarding the content of short courses for health officers it is believed that biostatistics, epidemiology, environmental sanitation, and administration should be emphasized. In schools serving southern states medical zoölogy should be included. In setting up training schools for nurses the institutions meeting certain requirements in regard to theoretical and practical instruction, according to the standards of the National Organization for Public Health Nursing, will be favored. Courses for sanitarians of the different grades will be organized along the same general lines, the course being worked out on the basis of experience. However, all trainees of whatever grade, will be expected to be well grounded in the principles of public health administration.

Another possibility in connection with the training of public health personnel is that of supplying instruction to persons already employed. Through this policy older employees would be enabled to secure new and up-to-date information as to public health procedures and thereby increase their personal efficiency and value to the organization in which they are employed. It may also be possible to use trainee reserves in local health units while regular employees are attending special short courses.

The prospect of strengthening state and local health administration through the medium of allotments from the Social Security appropriation is an alluring one. By no means the least important contribution to the public

health forces will come through the training of personnel.

SIGNIFICANCE OF PUBLIC HEALTH LEGISLATION IN THE SOCIAL SECURITY ACT

It is evident that the Congress, in considering this legislation, deemed it within the intent of what is known as the "welfare clause" in Paragraph 26, Section VIII, Article I, of the federal Constitution. In this respect the Public Health Title of the Social Security Act differs from most of the existing law relating to the functions of the Public Health Service, which has for its authority the power granted by the Constitution to the Congress to regulate commerce. This is regarded as being particularly worthy of note. For the first time in the history of the public health movement in this country, the Congress has made a declaration of permanent policy under which it assumes in part responsibility for protection of the health of the individual within the state and has made provision for participation of the federal government in the establishment and maintenance of administrative health services for this purpose. The significance of the authorization of an appropriation of \$11,800,000 for aid to the states for health services therefore lies not so much in the amount of federal aid provided for as in the effect of this enunciation of federal policy. It is obvious to everyone that \$11,000,000 or \$12,000,000 granted to the states by the federal government will not alone go very far toward meeting the need for more adequate local health service in this country; we need at least one dollar per capita, per year, or \$126,000,000 from all sources, to provide even the minimum of service required, and more for adequate service. The most important result of the Social Security Act in the field of public health should be the awakening of state and

local authorities all over the country to the need for devoting more attention to the public health and the stimulation of such authorities to the assumption of greater responsibility in making provision for adequate facilities for health protection.

With the exception of that part of the law dealing with crippled children, and possibly the provisions authorizing aid to states for maternal and child health services, the Social Security Act leaves one of our important public health problems as yet among the social security problems in the solution of which no substantial steps have been taken—the problem of medical care for the poor and for the low-income family that can pay something but not the whole cost of medical and hospital service which it requires.

THE MEDICAL CARE PROBLEM

I find myself personally unable to hold with some others to the doctrine that the working out of some solution of this problem is not a part of the public health problem. I have been unable to see the soundness of the distinction some of us have maintained between what we have called “public health work” and responsibility for seeing that adequate medical care is provided for those who cannot afford it. Nor can I see any good reason for assuming that the term “public health” should apply only to preventive measures.

Fifty years ago most of our mortality was caused by the acute communicable diseases; it was but natural, therefore, that our early activities in the protection of the public health were centered largely on the control of communicable illness. But the picture has changed and today we find our problems more and more in the prevention of disability and death from diseases that will not yield to environmental sanitation and immunization. I

venture to predict that the most important activity of the health department of the future will lie in the medical care field, at least in assumption of responsibility for meeting the problem and of leadership in working out the solution.

I am not prepared to advocate at this time that the health department shall actually undertake to render with its own personnel all medical care for the poor. I feel that there is and should be a place for the practising physician in a medical relief program wherever economic limitations will permit the utilization of his services. On the other hand, the provision of adequate medical care for the poor is a public duty, and the private physician can no longer be expected to carry the burden without adequate compensation. But I do not believe we shall have a satisfactory solution of the problem until the health department takes the leadership in working out with the medical profession a plan that will serve the need and at the same time make a place for the services of the private doctor. There can be no doubt of the need for more medical service, nor of the existence of a vast reservoir of potential service not now utilized; what we lack is the mechanism for putting this service to work.

THE RESPONSIBILITY OF STATE AND LOCAL AUTHORITIES

In conclusion, I should like to give special emphasis to just one point that may not be clear in connection with the provisions of the Social Security Act authorizing grants to states for public health work. The Act does not appropriate the funds—it simply authorizes the Congress to appropriate in any one year amounts *not to exceed* the sums set forth in the Act. Therefore the Congress is not bound to appropriate the amounts authorized and may appropriate so much or so little,

within the limitations of the Act, as it chooses to make available. There can be no doubt that in determining from year to year what the appropriations shall be, the Congress will be influenced by evidence of efficient administration and accomplishment or by the lack of it. We shall all be on trial. If our accomplishment should justify it, there is a possibility that the federal government may even increase its participation in the future; if we should fail, we shall not even hold the appropriations now authorized.

In passing on to the states the responsibility for organization of the work and for qualifications of personnel,

in the interest of preserving their independence, the Public Health Service rightly places largely upon them the responsibility for accomplishment and for the demonstration to the Congress that the grants from the federal government are being wisely expended. May I, therefore, urge those of you who will participate in the administration of these funds to see that the highest standards of professional service are maintained, that appointments are not made solely because of political considerations or personal friendship, and that no dollar is wasted. After all, the appropriations will be yours, and likewise the responsibility for preserving them.

Nutrition and Child Health*

A. B. SCHWARTZ, M.D.

Department of Pediatrics, Marquette University Medical School, Milwaukee, Wis.

AS far as the infant is concerned, there may be justification for the idea that nutrition has to do only with foods and food disturbances. Beyond infancy, such a conception of nutrition has neither physiologic basis nor practical usefulness. The White House Conference Report defines nutrition as "a study of the food substances and of the biochemical processes which utilize them." "Good nutrition," continues the Conference Report, "should mean that these biochemical processes are proceeding correctly."

When we speak of good nutrition we imply good health. In order for biochemical processes to function normally, it is necessary that every tissue in the body that has to do with these biochemical processes must function

normally. The teeth must be normal, and so must the saliva, the stomach and its juices must be normal, the heart and lungs, the excretory organs, and the nervous system must be normal. It is equally obvious that brief upsets of any of these and other structures may not recognizably upset nutrition.

Nutrition problems as seen in public health work are problems related to general health and are influenced by factors often remote from physiology alone. They are in fact problems of biology, psychology, and sociology.

Is there a way of measuring nutrition?

The idea of weight as a criterion of health is fallacious. Height and weight tables, despite much scientific protest, continue to play too large a part in child health work. It is reported that the largest return on any investment in the Century of Progress Exposition was that from the "Guess

* Abstract of paper read at a Joint Session of the Child Hygiene and Food and Nutrition Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

Your Weight" scales, and an editorial writer in the *Journal of the American Medical Association* remarks that "normal weight does not necessarily mean good health, nor do deviations from the average or mean always indicate poor health." Physiologic objections to the weight-height table as a measure of good or had nutrition do not need to be restated. Blackfan in his "Approach to the Subject" in the White House Conference publication on Nutrition makes the pointed comment, "The distinction between an activity of processes and the physical state which they produce justifies disregarding the static and dimensional criteria of growth and development."

The nutritional state as popularly measured by the height-weight relationship has attained an undue importance in the parents' mind and in our own daily work. It is high time that we began to teach that we do not measure health with a pair of scales. It is not important to know whether the weight and height of the particular child coincides with the average weight and height of a thousand other children. What is important to know is whether the weight and height of this child is within the limits of health for this individual child.

Weight and height tables of whatever kind, or the recently devised ACH index of Franzen and Palmer are useful as screening methods, roughly selecting those that need further examination. Represented as such, the ACH index seems the more selective method for large groups of children.

A good physical examination is a basic necessity in the study of child health. This, too, is not enough. Personal observation of the child in the home, a knowledge of his environment, an understanding of his attitudes in school and at play are all necessary in the appraisal of the child's health.

It is high time that we begin examining children and distributing information with a conscious realization of individual variations. Equally important as individualized physical examination is the need for individualized instructions by child welfare workers.

If we are going to do nutrition work among children, let us see to it that we do it with a proper understanding that the child's nutrition problems are not only problems of vitamins and mineral salts but also problems of psychology and sociology. Enough people should be trained in child health, in home nursing and in social service to provide a more adequate service. The children of families able to pay for such service should be referred to their private physicians. The welfare station that takes care of this group of children is not only wasting community funds, but cluttering up its own work, and thereby giving less efficient service to those who do need it.

Much waste of a family's income could be eliminated by a proper attention to this problem in a nutrition clinic.

Useless vitaminizing should be part of the child health clinic's concern. The importance of the respective vitamins in child health needs no restatement. Their discovery and application constitute one of the most thrilling chapters in medicine. Eventually, their isolation as crystalline substances will further increase our understanding of their usefulness. Each vitamin has a recognized value sufficiently established to make it an essential implement in any health program. This does not make necessary the indiscriminate prescription of vitamins for conditions in which their usefulness is still in the speculative zone.

Vitamins are important but they are not the whole story. A diet list will not relieve all the defects of nutrition.

Engineering Control of Occupational Diseases*

J. J. BLOOMFIELD, F.A.P.H.A.

Sanitary Engineer, United States Public Health Service, Washington, D. C.

THE control of occupational diseases lies chiefly within the sphere of two types of workers, the physician and the engineer. It is within the province of the physician to diagnose occupational diseases and primarily to recognize the existence of those diseases due to the factory environment. Based on the findings of the physician, the engineer is in a position to learn where control measures are to be initiated. His functions are two-fold: First, he must study the local plant conditions which have been shown to be detrimental to health and by precise quantitative measurements determine the extent of the hazard. Second, once the nature and degree of the hazard have been demonstrated, the engineer must consider ways and means for controlling or minimizing the dangerous condition and for studying the effectiveness of these measures.

It is the purpose of the present contribution to discuss the various engineering methods which may be applied in the evaluation and control of industrial health hazards.

THE STUDY OF THE WORKROOM ENVIRONMENT

Certain preliminary steps of fundamental importance must be undertaken

in order to serve as a guide in the more detailed studies which may be indicated. These consist of the sanitary survey and the occupational analysis of the workroom.¹

The sanitary survey of a workroom consists of noting provisions for ventilation, illumination, fire protection, accident protection, exposure to specific poisons, such as dusts, fumes, vapors, and gases, fatigue, and so on. Thus, the survey serves as a guide in establishing which hazards require further study in the form of actual quantitative determinations.

The occupational analysis permits one to learn of the activities involved and the particular hazards associated with each occupation, and the number of persons in each occupation. Perhaps a typical illustration from actual experience will demonstrate the value of the preliminary survey of an industrial establishment.

Studies of industrial morbidity among iron and steel workers conducted by this office showed that pneumonia, in all forms, occurred in nearly twice the number among these workers that it did among employees of other industries, during a 3 year period of observation.² A 5 year inquiry into the causes of high pneumonia rates among iron and steel workers in a representative mill disclosed the fact that the largest number of cases occurred in certain departments, such as in the blast furnace and

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

TABLE I

FREQUENCY OF PNEUMONIA ACCORDING TO OCCUPATION AND IN RELATION TO THE NATURE OF INDUSTRIAL EXPOSURE INVOLVED IN THE BLAST-FURNACE DEPARTMENT, 1924-1928

Sections and Occupations	Nature and Extent of Industrial Exposure ¹					Annual Number of Cases of Pneumonia per 1,000 Men	Number of Cases of Pneumonia		Approximate Number of Years of Life Observed
	Heat With Wide Changes in Temperature	Strenuous Work	Out-door Work in All Kinds of Weather	Gases and Smoke	Dust		Actual	Expected ²	
All sections						14.0	36	10	2,578
Stacks and stoves (casting section)						27.2	17	2	624
Keeper	**	**	*	**	*	8.3	1	0	120
First and second helpers	**	**	*	**	*	41.5	12	1	289
Blowers	*	0	*	*	0	0.0	0	0	52
Hot blast men	*	*	**	**	*	16.7	2	1	120
Stove cleaners	*	*	**	**	**	46.5	2	0	43
General labor section and car dumper laborers	0	0	**	0	0	30.7	15	2	489
All other sections ³	*	*	*	*	*	2.7	4	6	1,465

¹ Symbols for extent of exposure:

0 No exposure

* Slight or occasional exposure

** Heavy exposure

² Number expected from the rate per 1,000 men in "all other departments" in Table VII.³ Eight per cent of the men heavily exposed, 23 per cent slightly or occasionally exposed to heat with wide temperature changes. To strenuous work, no one was heavily exposed and only 5 per cent had occasionally to work strenuously. To outdoor work in all kinds of weather, about 8 per cent of the men were heavily exposed, 80 per cent slightly or occasionally exposed. To gases and smoke, about 5 per cent were heavily and 25 per cent slightly or occasionally exposed. About 1 per cent of the men were heavily exposed to dust and about 55 per cent slightly or occasionally exposed.

open-hearth steel mills. When one realizes, however, that these departments contain anywhere from 60 to 100 different occupations, the task of a preventive program is almost a hopeless one, unless definite information is obtained concerning such important items as (1) the number of persons, (2) the activities, (3) the health hazards, and (4) the incidence of pneumonia for each occupation. Such information is available from a preliminary sanitary and occupational survey.

For example, in the study mentioned, it was found that the most important exposures associated with the various occupations were: heat, with wide changes in temperature, gases (sulphur dioxide, hydrogen sulphide and carbon monoxide), dusts, strenuous work, and outdoor labor in all kinds of weather. Table I presents the frequency of pneumonia according to occupation in the blast furnace department, in relation to the nature of the exposures, during

the period of 1924-1928. It is quite obvious that the highest pneumonia rates occurred among those occupations exposed to one or more of the potential hazards cited. The actual number of cases for those occupations not associated with these five exposures (all other sections) was found to be even less than the expected cases of pneumonia for such workers. Such a preliminary survey indicated that, in the blast furnace department, attention should be centered on occupations in the casting and general labor sections, in an effort to determine the degree of exposure to gases, dusts, extreme temperature changes, and so on. Such studies are carried out by the engineer, whose task it is to determine the extent of the occupational exposure to the materials and conditions enumerated. Once these factors have been evaluated, the engineer is in a better position to initiate control measures for the minimization of the hazards demonstrated to be deleterious to health.

The magnitude of the problem confronting the engineer in industrial hygiene is as large as it is varied. According to a recent analysis made by Dublin and Vane,³ there are some 94 groups of industrial poisons in the United States, associated with about 900 different occupations. In the limited space allotted for the present discussion it will only be possible to point out a few of the major problems in this field with which the engineer is concerned.

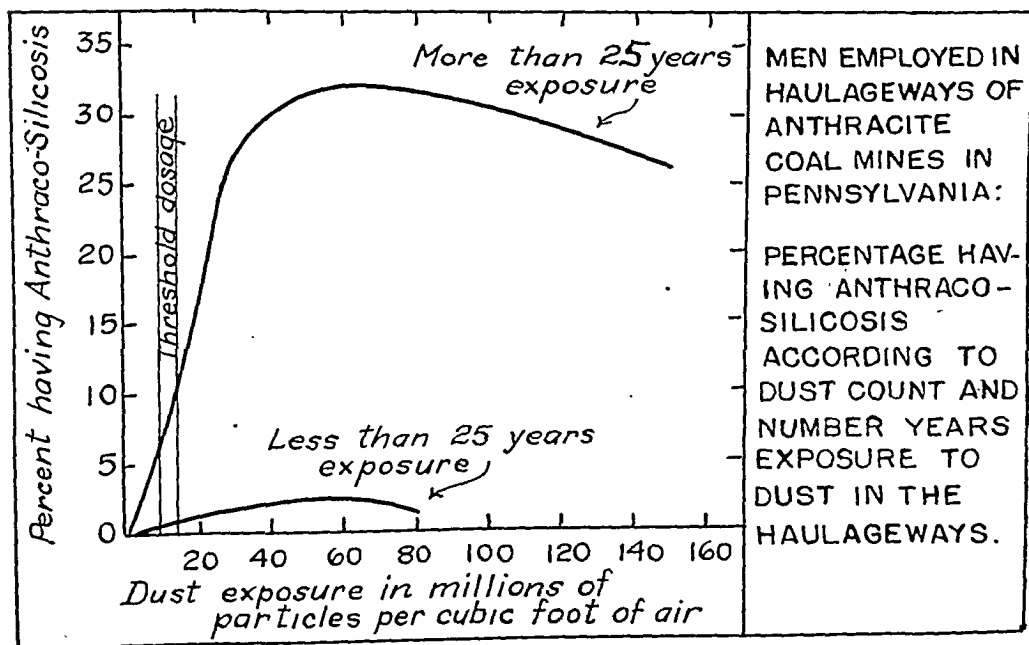
The subject of the health of workers in dusty trades has been receiving considerable attention from students of industrial hygiene and others interested in the various phases of this problem. When one realizes that the workmen employed in the dusty trades comprise the largest group exposed to any one industrial hazard it is quite apparent that the importance of this problem has not been overestimated. Furthermore, it is by now fairly well established that exposure to certain kinds of dust has increased the mortality rate from respiratory diseases.

As a result of the studies conducted

by this office and other agencies, it has been fairly well established that a knowledge of the properties of a given dust which determine its capacity to produce pulmonary pathology is essential. Numerous investigations of the industrial dust problem indicate that these properties are the chemical and mineralogical composition of the dust, its concentration in the industrial atmosphere, and its particle-size. It is within the province of the engineer to determine these factors in the industrial dust problem. How important these determinations are in such studies is well exemplified by the results of our recent investigation made among anthracite coal miners.⁴

In this particular investigation it was found that the various mine and surface workers were exposed not only to different concentrations of dust but also to dusts of varying composition. For this reason, in the present discussion, data will be given for a group of workers inhaling a dust of the same composition. For example, the engineering study disclosed that workers in the mine haulageways were exposed

FIGURE I



not only to the dust arising from both coal and rock working operations but also to the sand dust used on the rails to obtain traction. A study of the composition of this dust showed it to have a total silica content of 34 per cent, a quartz content of 13 per cent, with 58 per cent of the dust consisting of coal. Due to the relatively low dust concentrations in the haulageways, the mine operators did not suspect a health hazard among the men employed in the gangways.

Figure I shows the percentage of men having anthraco-silicosis under different average dust concentrations and number of years' exposure to such concentrations. When the duration of employment or exposure was less than 25 years, only a negligible proportion of the men developed anthraco-silicosis. There were, in fact, only 3 cases among the 408 men examined whose length of employment was less than 25 years, a percentage of less than 1 for this group as a whole. When the exposure exceeded 25 years, about one-fourth of the men were found to have anthraco-silicosis. The curve of cases mounted rapidly from an exposure of 10 to 20 million dust particles per cu. ft. of air to 80 million particles, at which exposure about one-third of the men were found to have this disease. It is of interest to note that the curve of cases declined slightly under higher dust exposures. Although one cannot state definitely the reason for this tendency, it may be due to the factor of selection.

This single example concerning one of the important problems in industry illustrates the rôle played by the engineer in the field of industrial hygiene. In the present case not only was the study of the degree and nature of the dust exposure valuable in determining the cause and extent of the hazard, but it served as an aid to the solution of the problem; namely, the removal of the dust to a level indicated as safe by

the results of the investigation. The graph also shows the approximate threshold dosage, which may be set tentatively at 10 to 15 million particles per cu. ft. for this type of dust. Only 4 cases of anthraco-silicosis were found among the men exposed to 10-20 million particles and none was found at an exposure of less than 10 million particles. With such information, the engineer is in a position to consider ways and means for the suppression of the dust in the haulageways to the concentration which is indicated as safe.

In the studies of occupational diseases due to the inhalation of certain toxic dusts, such as lead and radium, the engineer has also played an invaluable rôle. In a recent study of lead poisoning among storage battery workers, conducted by the Public Health Service,⁵ it was of importance to determine the relationship between the amount of lead dust inhaled by the men and the incidence and severity of plumbism. Such a study is valuable in that it may indicate the maximum amount of lead which may be inhaled with impunity. Table II shows the fundamental correlation between the lead in the air and the rate of plumbism in the major departments of the plant in which our study was made.

TABLE II

LEAD EXPOSURE AND MAXIMUM MONTHLY RATE OF INITIAL COMPENSATION CASES FOR PLUMBISM

Department	Mg. of Lead per 10 cu. m. of Air	Maximum Monthly Rate (per 100)
Mixing	120.0	44.0
Pasting	50.0	12.0
Burning	5.7	4.4
Casting	1.2	0.18

It is evident that a close correlation exists between the lead exposure in different departments and the risk of developing a case of lead poisoning. Of considerable interest is the fact that a more detailed analysis of the clinical and dust findings indicated that 1.5 mg. of lead dust per 10 cu. m. of air, except for prolonged exposure, is the

limit of safety under the conditions encountered in this study. This important finding is of great value to the engineer, since it gives him a basis upon which to develop protective devices in the way of exhaust ventilation, respiratory protection, and so on.

Utilizing the same technic employed in the study of the dust problem, the writer conducted a study in 1928 on the health hazards associated with chromium plating.⁶ A study of the amount of chromic acid inhaled by these workers, along with physical examinations, showed that ulceration and perforation of the nasal septum was usually associated with an exposure in excess of 1 mg. of chromic acid in 10 cu. m. of air. These results are shown in detail in Table III. It is observed that a fairly good correlation was found to exist between the intensity of exposure to chromic acid mist and the amount of damage to the nasal mucosa,

that part of the respiratory tract usually affected by such exposure. As a result of this finding, it was possible to design chromium plating tanks provided with a certain type and degree of exhaust ventilation, which keeps the air at the worker's breathing level less than 1 mg. in 10 cu. m. and perhaps completely free from chromic acid. In a later portion of this discussion it will be shown exactly how this control problem was handled.

Studies of the industrial environment of the type indicated may be said to serve a three-fold purpose: First, they enable one to determine the extent of the hazard. This is accomplished by ascertaining occupational exposures to toxic materials or conditions. Second, if clinical studies are made, the findings may indicate the permissible amounts of toxic materials tolerated with safety. Third, quantitative studies of the work-room environment are valuable in the

TABLE III

OCCUPATIONAL HISTORY AND CLINICAL FINDINGS OF WORKERS EMPLOYED IN PLANTS ENGAGED IN CHROMIUM PLATING

Case No.	Occupation	Months Employed in Chromium Plating Room	Hours per Day Over Tank	Approximate CrO_3 Exposure in mg. per 10 cu. m.	Perforated Septum ¹	Ulcerated Septum ¹	Inflamed Mucosa ¹	Nose Bleed	Chromic Holes	Remarks
1.	Chromium plater	6½	4	15.0	xx	—	xx	x	x	
2.	"	20	4	28.0	xx	—	x	x	x	
3.	Foreman plater	7	2	25.0	—	xx	xx	x	—	
4.	"	8½	3	25.0	—	xx	xx	x	—	
5.	Chromium plater	3½	4	56.0	—	xx	xx	x	x	
6.	"	¾	7	1.2	—	—	xx	x	x	
7.	"	¼	7	1.2	—	—	xx	x	—	
8.	"	7	7	1.2	—	—	xx	x	—	
9.	"	3	7	1.2	—	—	xx	—	x	
10.	"	36	4	2.0	—	—	xx	—	—	
11.	"	5	6	1.2	—	—	x	x	x	
12.	"	¾	6	1.2	—	—	x	—	—	
13.	"	12	4	28.0	—	—	—	—	—	Used Vaseline in nose
14.	"	¾	2	28.0	—	—	—	—	—	
15.	Nickel plater	1½	0	(2)	.....	x	x	x	—	Cyanide burns
16.	Racker	8	0	(2)	x	—	x	x	—	
17.	"	¾	0	(2)	—	—	x	—	—	
18.	"	¾	0	(2)	—	—	x	—	—	
19.	Wiper	1¾	0	(2)	—	—	x	—	—	
20.	Foreman	0	0	0	—	—	x	—	—	Work in other departments of factory
21.	"	0	0	0	—	—	—	—	—	
22.	Clerk	0	0	0	—	—	—	—	—	
23.	Inspector	0	0	0	—	—	x	—	—	

¹ xx, marked; x, slight; —, negative.

² Unknown.

control of a hazard. This is performed by testing the efficiency of any devices which may have been introduced for the minimization of the hazard.

In closing this portion of the discussion it is well to point out that the engineering problems in industrial hygiene will increase in number in the very near future. New processes and chemicals are constantly coming into use and many well known toxic substances are finding new applications in industry. Our knowledge of the action of these substances on the body is being augmented by the work of toxicologists and by field studies of the type presented in this paper.

THE CONTROL OF INDUSTRIAL HEALTH HAZARDS

No set rules may be established for mechanical protection to control an industrial poison. Specific conditions will determine the type of protection. In general, there are 5 methods which may be attempted: (1) substitution of a non-toxic material, (2) isolation of the harmful process, (3) wet methods, in the case of some dusty processes, (4) exhaust ventilation, and (5) respiratory protection.

One example of the substitution of a non-toxic material is the possible use of metallic or other type of artificial abrasive for sand, in the sandblasting process, in operations in which it is not essential to use sand (a substance high in quartz content).⁷ An excellent illustration of isolation is the mechanical enclosure of a dust-creating process by the modern sandblast barrel used in the cleaning of small objects. It is apparent from Table IV that a tremendous reduction in dust has been effected by the substitution of wet for dry methods in the case of both drilling and rock loading.

In most dusty processes, however, the most effective means of dust elimination are by the use of properly de-

TABLE IV
CONTRASTING "WET" AND "DRY" METHODS OF
ROCK DRILLING AND LOADING

Processes	No. of Samples	Average Dust Count in Millions of Particles per cu. ft.	
		"Dry"	"Wet"
Drilling	23	568	33
Loading	10	636	32

signed exhaust ventilation systems. Since in many instances it is a difficult, costly, and at times unnecessary procedure to remove all the dust in the vicinity of a worker, it would be helpful to determine the minimum amount of a certain dust which the worker can apparently tolerate with impunity. Such information can be made available by the type of studies carried out by the Public Health Service (already mentioned).

For example, in the anthracite coal study,⁴ it was found that miners exposed to less than 50 million particles of coal dust per cu. ft., with less than 5 per cent quartz in the dust, apparently suffered no disability even after many years of work. In the case of workers in haulageways, who were shown to be inhaling a dust with a higher silica content, the safe limit was placed at 10-15 million particles. In certain of the mines under investigation, control measures were already in force, showing that dust may be eliminated to a certain extent and oftentimes to a safe concentration. Table V shows the results of an engineering study of the control measures practised in some of the mines, and clearly depicts the effective reduction of dust in many of the occupations.

Another example is indicated in the results of a study now in progress in connection with mercurialism among workers in the hatters' fur cutting industry. Table VI shows the exposure to mercury dust and vapor of some of the workers in this industry under controlled and uncontrolled working con-

TABLE V

SUMMARY OF RESULTS CONTRASTING THE DUST EXPOSURE OF MINE WORKERS UNDER CONTROLLED AND UNCONTROLLED WORKING CONDITIONS

Operation	Dust Concentration in Millions of Particles per cu. ft. of Air		Remarks
	Controlled	Uncontrolled	
Firing charge	40	834	Unless at least 15 minutes elapsed after firing a charge, miners found to be exposed to high dust concentrations.
Loading coal or rock	32	636	By wetting the loaded material the dust count is reduced as shown.
Loading coal	4-26	291-1,138 *	Mechanical loading decreases the dust exposure as indicated.
Drilling	33	568	Wet drilling is effective in reducing the dust concentration. Further reduction would necessitate exhaust ventilation.
Hauling coal in mines	1.2	17	Wetting coal and empty cars reduces dust in haulageways.
Preparation of coal	24	380	Wet breakers reduce dust counts as shown.

* The lower result is associated with the hand loading of wet coal while the higher average is based on the hand loading of dry coal.

ditions, and that where some measure of control is practised (segregation or local exhaust ventilation), a material reduction in the exposure has been effected. It is our belief that in the case of blowers such reduction may be effected by mechanical enclosure and local exhaust ventilation, and, with shippers, by a general system of ventilation sufficient to change the air in the storeroom frequently enough to bring the mercury concentration to a lower level. Unfortunately, in the present investigation, it has been impossible to find a plant in which an attempt has been made to reduce the exposure for these two occupations.

TABLE VI

EXPOSURE OF HATTERS' FUR WORKERS TO MERCURY DUST AND VAPOR UNDER CONTROLLED AND UNCONTROLLED CONDITIONS

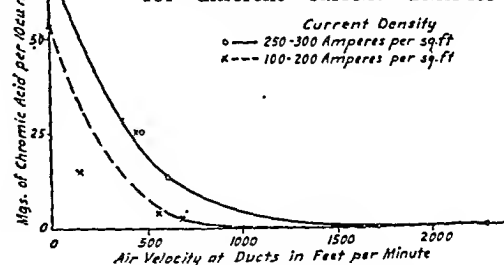
Occupation	Total Mercury Exposure in mg. per 10 cu. m.		Method of Control
	Uncontrolled	Controlled	
Blowers	4.6	...	None practised
Shippers	7.2	...	" "
Cutters	4.0	1.8	Local exhaust ventilation
Sorters	3.8	1.7	"
Brushers	3.1	1.2	"
Drummers	2.5	0.6	Segregation
Clippers	1.5	0.7	"

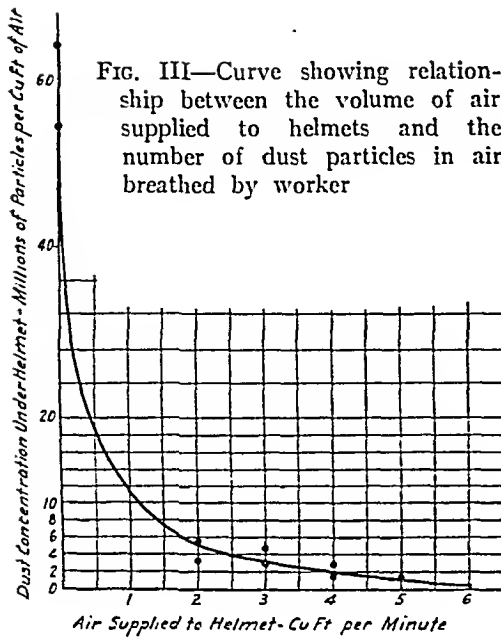
While the chromium plating study was being conducted, exhaust ventila-

tion methods for the removal of chromic acid mist were also investigated. Figure II shows the relation between the degree of air velocity at the exhaust ducts and the amount of chromic acid in the air.⁶ It is evident from this study that in order to keep the chromic acid content in the air to an amount less than 1 mg. in 10 cu. m. (the minimum amount found to cause no damage to the nasal septum), at least 1,500 feet per minute of air movement at the face of the duct is necessary, especially at the higher electric current densities commonly encountered in electroplating.

Perhaps one additional illustration of the rôle played by the engineer in the control of industrial hazards may

FIG. II—Relation between air velocity of local exhaust system and amount of chromic acid in air for different current densities





be mentioned at this time, to show the varied and important problems confronting him. In the study conducted with health hazards involved in cleaning castings by means of abrasive blasting,⁷ it was found that the only practical safeguard was to provide the worker with a mask or helmet of the positive pressure type. In studying the efficiency of such devices it was found that a relationship existed between the amount of air supplied to the helmet and the concentration of dust inside the helmet during blasting. In an attempt to determine the optimum air volume to be supplied to such protective devices, it was necessary to obtain dust samples from inside the helmet while varying the air volume, at the same time maintaining the dust concentration in the sandblast room (outside the helmet) constant. Figure III shows the results of such a study and clearly indicates that the positive supply of 6 cu. ft. of dust-free air per minute will protect a worker under the operating conditions now in practice in sandblast rooms. The ultimate criterion of protection, however, is the result of dust determinations of the air within the helmet, that

is, the air actually breathed by the worker and not the volume of air supplied.

From some of the examples cited in this paper it would seem logical to take appropriate measures for their control. That the problem of industrial hygiene is of considerable magnitude is evinced by the fact that we now know that the industrial population experiences high morbidity and mortality rates, partly as a direct result of the working environment, and in addition the number of persons involved is rather large. According to the U. S. Census figures for 1930,⁸ in the manufacturing, mechanical and mining industries alone there are some 15 million persons gainfully employed, so that industrial hygienists are at once faced with the task of providing adequate health services for a large number of workers engaged in occupations that are known to entail an exposure, in many instances, to deleterious materials and conditions.

One is also confronted with the fact that, in this country, the majority of establishments are very small, too small in fact to conduct individual programs of industrial hygiene. From a study recently made by the writer in a typical industrial area,⁹ and from the Census data of 1930, it is known that approximately 90 per cent of the industrial plants in this country employ less than 100 persons. The consensus of opinion among students of this subject is that the needs of industrial hygiene may best be cared for by local health departments. In fact, many of the state departments of health are now recognizing the necessity of a preventive program in industry and are considering ways and means for establishing such work as an integral part of their organizations.

It is not the purpose of the present paper to delve into the reasons for the necessity of industrial hygiene work in health departments, except to indicate

that once such a program is initiated, the engineer's rôle in it will be an important one, since the task of prevention will largely lie in his hands. It is probably apparent by now from the brief discussion given herein that in order for an engineer to carry on such work he will have to be thoroughly trained in industrial hygiene and be familiar with industrial processes. Such a person should be well grounded from both a theoretical and practical viewpoint in the fields of microscopy, gas chemistry, physiology and mechanics of ventilation, industrial sanitation, illumination, and, most important of all, he should have a broad public health viewpoint. It is apparent that neither a sanitary, mechanical, nor chemical engineer, *per se*, exactly fulfils these requirements. But, there is no reason why an individual with basic engineering training cannot in time be metamorphosed into an industrial hygiene engineer.

In closing, it is well to emphasize one

point; namely, that occupational diseases are in a large measure preventable and the degree of prevention exercised by a community will be reflected in the general health status of that community.

REFERENCES

1. Bloomfield, J. J. Preliminary Surveys of the Industrial Environment. *Pub. Health Rep.*, 48, 44 (Nov. 3), 1933.
2. Brundage, D. K., Russell, A. E., Jones, R. R., Bloomfield, J. J., and Thompson, L. R. Frequency of Pneumonia Among Iron and Steel Workers. *Pub. Health Bull. No. 202*, Nov., 1932.
3. Dublin, Louis I., and Vane, Robert J. Occupational Hazards and Diagnostic Signs. *U. S. Bureau of Labor Stat., Bull. No. 582*, 1933.
4. Anthracosis-Silicosis Among Hard Coal Miners. *Pub. Health Bull. No. 221*, 1935.
5. Russell, A. E., Jones, R. R., Bloomfield, J. J., Britten, R. H., and Thompson, L. R. Lead Poisoning in a Storage Battery Plant. *Pub. Health Bull. No. 205*, 1933.
6. Bloomfield, J. J., and Blum, William. Health Hazards in Chromium Plating. *Pub. Health Rep.*, 43, 36 (Sept. 7), 1928.
7. Bloomfield, J. J., and Greenburg, Leonard. Sand and Metallic Abrasive Blasting as an Industrial Health Hazard. *J. Indust. Hyg.*, 15, 4 (July), 1933.
8. 15th Census of the U. S. Census Bureau: Occupations by States, Vol. 4, 1930.
9. The Potential Problems of Industrial Hygiene in a Typical Industrial Area in the United States. *Pub. Health Bull. No. 216*, Dec., 1934.

Scorpion Deadlier than Black Widow Spider

MORE lives have been lost in Arizona from the sting of scorpions than from the bite or sting of any other venomous insects or reptiles according to the records of the Arizona State Board of Health. The records disclose 35 deaths from poisonous insects and reptiles in the past 6½ years, of which 25 were caused by the sting of the scorpion.

This record has caused the State Board of Health to declare the scorpion as the greatest death menace

in the state among the insects and reptiles, and far more dangerous to human life than is the black widow spider about which so much has been written recently. . . .

Considering the high mortality associated with insect bites in Arizona, it is hoped by the Board that in the near future some biological house will establish research work to determine the feasibility of providing an antiserum for these serious accidents.—Arizona State Board of Health.

Mental Hygiene in the Provincial Health Service*

GRANT FLEMING, M.C., M.D.,
D.P.H., F.A.P.H.A., F.R.C.P. (CANADA), (*Life Member*)
*Professor of Public Health and Preventive Medicine, McGill University,
Montreal, Canada*

IT is obvious that in order to consider mental hygiene in its relationship to the public health organization of a province, it is necessary to set down, in a brief but comprehensive manner, what is meant by mental hygiene and also what is the provincial responsibility for public health services.

To begin with the latter, we may say that, despite a consistent and insistent demand from those interested in public health for greater interest in and participation by the federal government in the field of public health, there is no disposition to free the province of its primary responsibility for the care of the public health.

In times past, the province made the health laws and regulations, and then passed to the local administrative authorities the responsibility for their enforcement. This has, in general, resulted in the creation of reasonably adequate public health departments in the larger centers of population, the residents of which were willing and able to finance such departments. City health departments are, to a very large extent, autonomous units.

With the demand for public health service in the towns and rural areas

which had, in fact, little or no service, the provinces came to accept in varying degrees an increasing measure of responsibility for financial assistance, advisory services, and supervision. Today, most of our rural health units are, in practice, decentralized units of a provincial service, with the province supplying practically all the services in such fields as sanitary engineering and tuberculosis control. In other words, the provincial health department no longer confines itself to law enforcement, and supervisory and advisory service, but is actually an operating agency in those fields of public health which, for one reason or another, cannot be fitted to advantage into the local public health organization, except perhaps in the largest centers of population.

This point is elaborated because we are coming to accept mental hygiene as one of the services which should be organized on a provincial basis, along lines very similar to what has been found most effective in tuberculosis, cancer and venereal disease control by certain of the provinces. In no other way does it seem possible to bring to all the people of the province that part of the mental hygiene service which must be provided, or at least directed, by a specially qualified staff. Few local areas could finance the service,

* Read at a Special Session on Mental Hygiene of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

and even if they could, there is not enough staff available, nor is there the need for such staff, to work on a full-time basis, in local areas outside the cities.

Mental hygiene is an essential part of any health service for the reason that personal health depends upon a combination of both physical and mental fitness in the one individual. If we accept the main purpose of public health as that of increasing human happiness through the prevention of disease and the promotion of efficiency and effectiveness during a longer span of years, by developing to the full the potentialities of the individual, it follows that mental hygiene must be a part of public health.

Mental disease, mental disorders, and the host of great and small defects in personality constitute a greater deterrent to individual happiness and socially acceptable lives than do the corresponding abnormal physical states. True it is, as has been suggested, that the physical and mental are closely related, and that the cause of the symptoms of what may appear to be solely either a psychological or a physiological problem may lie in one or the other, or in a combination of physical and mental. Both physical and mental must be dealt with if either is to be treated adequately, for man is not merely a wonderfully complicated physical machine.

Every worker who comes in contact with human beings requires a knowledge of mental hygiene. To deal successfully with people, you must know people, which is another way of saying that you must understand human behavior. Not only is it necessary to have an understanding of the behavior of other people; it is infinitely more important to be able to recognize the basis for your own feelings and actions under various conditions.

Mental disease and mental disa-

bilities are so common that they cry out for preventive measures. Many of those who would do nothing justify their negative attitude by stating that not enough is known to permit of any worthwhile preventive effort. Surely this is not so, for can we not accept, at least, the importance of environment and the attitudes of parents or teachers with regard to the mental health of the child, and set in action some planned constructive work in the home and the schools? Surely we are satisfied that the treatment of the parent or the teacher is one very important part of the treatment of the problem child. Tuberculosis is being fought successfully despite the lack of specific means for the prevention and cure of the disease, largely through an attack on the physical environment.

It is desirable to consider some of the factors which are holding back the development of mental hygiene. The first that comes to mind is the public attitude toward mental disorders, an attitude indeed that is not limited to the public, for many physicians seem as reluctant as is the public to recognize or accept the reality of mental disease. A diagnosis that is qualified as "mental" is apt to be regarded by the patient's family as a social stigma.

A majority of children cannot achieve to the extent that their parents hope for and, unfortunately, in some cases demand. Parents who accept as a matter of course the differences which exist in the physical equipment of children may be and often are resentful of any suggestion that their child has been endowed with less intelligence than some other child. The result of this attitude on the part of the parents is that the child is frequently driven to tasks which are beyond his capacity. Every child should be assigned tasks which are sufficiently difficult to call upon his powers, but continued and repeated failures create in him a firm conviction

of his inferiority. Achievement and recognition, personal satisfaction and social approbation are necessary experiences for the child and the adult, to encourage each to persist in the learning process.

Prejudice and ignorance must be fought by enlightenment through education. Mental disease was not accepted as arising out of natural causes until a very long time after the supernatural was forgotten as a cause of physical disorders. The public and the professional attitude toward mental disease is travelling the same, road years later, that had been trod with regard to tuberculosis, venereal disease, and cancer.

There was a time, not so many years ago, when we spoke of a child welfare program, of a campaign against tuberculosis, or some other specific item of public health service, as if such movement were and could be separate and distinct. Later we learned that fundamentally all these supposedly different items were in reality much the same, with particular emphasis placed here and there. This must be true, because behind every health program, no matter what name is attached to it, there must be the same basic principles of general health.

There is no reason why this mistake should be duplicated as regards mental hygiene. Any suggestion that the solution of the mental health problem is to be found in the creation of a separate division or department, with the establishment of a new group of clinics, is doomed to failure. Mental hygiene will be effective in proportion to the extent to which it is integrated into all the public health services which touch the lives of the people.

Because of its relationship to other provincial departments, notably education, justice, and public welfare, the question arises as to whether mental hygiene should be organized as a part

of the public health department, or as a separate department of government, closely linked with others requiring mental hygiene in their services, notably departments of health and welfare. In any particular situation, we recognize that organization is based on the personnel available.

Mental ill health may bring the individual to a mental hospital as a patient, to the courts as a delinquent, or to a welfare agency as a social problem. This is because of a faulty system of diagnosis and our existing organization, for we know that such cases should be considered in terms of the personality problems presented and should receive the treatment indicated. Essentially, mental health and mental disorders constitute a medical problem and, therefore, mental hygiene should be organized as a part of the public health service. We believe this to be so in our teaching situation, and so we include mental hygiene instruction in the curriculum of our university department of public health and preventive medicine for the various professional schools. Personal experience dictates the desirability of such an arrangement for many reasons, not the least important of which is the effect of the arrangement upon the attitudes of the personnel of the department in all the teaching.

This should in no way minimize the effort to bring mental hygiene into the educational system, the courts, and the public welfare services. It may be said that one of the major responsibilities of the mental hygiene director in the public health service will be to extend his field in order that he may give direction and help to leaders in other departments and professional fields.

In stating the program for a mental hygiene division in the provincial health service, it is possible to enumerate a vast number of items and to present arguments which would justify their

inclusion. In the future, they will likely all be included, but at our present stage of development, it seems wise to adopt a more limited and circumscribed program, because it is better to be specific to begin with, to take one step at a time. Furthermore, as the amount of money will always be limited, it is important to expend what sum is available upon those activities which will give the greatest return through doing the greatest good for the greatest number.

The modern public health movement came into being during the latter part of the 18th century as an expression of humanitarianism. It was not long before the principle came to be accepted that care of the public health was not only Christian but was good business, and soon it was proclaimed that public health pays.

When we say that the first item on our mental hygiene program must be the provision of adequate care for those who, through no fault of their own, are in need of institutional treatment, we might be tempted to add, in a somewhat apologetic tone, that "humanity demands this," whereas the truth is that it is always "good business" for any community to take care of its sick, whether the disorder be physical or mental.

Mental hygiene has a further difficult task. There are individuals who are born with those varying degrees of low intelligence which demand special educational facilities if each individual is to be trained so as to be, within the limitations of each, a self-supporting, socially acceptable citizen.

The special institutions for treatment and training are a part of the mental hygiene service just as the sanatoria and other institutions are part and parcel of the tuberculosis control program. Institutions are mentioned first because the provinces had accepted responsibility for institutional care and

provided institutions long before mental hygiene was even thought of. Even though the institutions may not be adequate, it is around them that we may hope to develop the provincial mental hygiene program.

Next on the program comes public education. The reason for this is obvious. First of all, the public must be informed as to the gravity and extent of the problem. In other words, public interest must be aroused through an understanding of the situation as it exists and so be prepared to support, financially and otherwise, the mental hygiene program.

The real object of arousing interest is to seize the opportunity of presenting a plan for meeting the need. It is fair to say that mental hygiene has suffered seriously because certain irresponsible persons have led a section of the public to believe that mental hygiene is some sort of 'magic system' which can furnish a formula for solving all the personal and social problems of mankind.

It is essential that public instruction be fairly conservative, and that it express and interpret to the public the generally accepted opinion of those who are qualified to lead in this particular branch of science. At the same time, attention will be given to combating the old superstitions, which still prevail, regarding mental afflictions. This alone will require much time and effort because old ideas die hard.

Past experience would seem to justify a feeling that while there is a very definite place for health education directed toward one specific objective, a considerable part of the continuous instruction of the public in mental hygiene, by means of the printed word particularly, should be as a part of the whole health teaching. Unless it is so integrated, the mass of the public will fail to accept that mental hygiene instruction is part of the whole, and

so will be perpetuated the false idea that mind and body are separate and unrelated.

The instruction of the public in mental hygiene should come under the division of health education of the provincial department of public health. The machinery which already exists can thus be used. The provincial baby book can and should include consideration of the development of the whole child, mentally as well as physically. Health teaching which has to do with personal health as distinct from the control of the physical environment cannot deal adequately with the particular subject under consideration unless it include a study of the mental life of the individual.

Once public interest has been aroused, there will come a demand for information. As has been suggested, the division of health education in the health department can be used to meet much of this demand. In the health department is found also another medium for the education of the public. The public health nurse has proved to be the most powerful force in the continuous dissemination of health information to the public.

In speaking so highly of the public health nurse, it is not with the idea of disparaging the importance of other public health workers as health teachers. Because of the number of public health nurses, their close association with the families through home visiting, and their already established place in the field, they are, in effect, the health teachers of the community.

If the public health nurse, or anyone else, is to teach mental hygiene, she herself must have a fairly thorough knowledge of the subject. Staff education is one of the most important items in the provincial mental hygiene program. Staff education should begin with members of the provincial department itself, and extend gradually to

staffs of health, social, and educational agencies throughout the province. This is essential to bring existing staffs up to date in their equipment for teaching. Continuous staff instruction in all fields is recognized as necessary, but we cannot hope that new appointees will come prepared in mental hygiene until there is adequate instruction and experience during training in medical schools, schools of nursing, schools of public health and social work, and also in normal schools.

Just as intelligent students have made use of knowledge regarding personal hygiene for their own benefit as well as that of their clients, so the same intelligent students will find in mental hygiene a great personal asset to assist in solving the problems of life which all must face. It would be fair to say that all students should have mental hygiene training.

If we are to have sound instruction, then we must have competent teachers, and here is one of the most difficult needs to be met, because of the lack which exists and the time it takes to develop teachers.

In the provincial organization are found the staffs of the various provincial mental hospitals. It is no reflection upon the members of these staffs to say that, because of a tremendous pressure of work, they are apt to develop a somewhat narrow institutional point of view. It seems desirable, both for the staff and the public, that there be organized mobile mental hygiene clinics, staffed from the mental hospitals, to provide service. This would serve also to broaden the field of interest and experience of the institutional staffs by bringing them into contact with the non-institutional type of case; it would provide for them an opportunity to learn, through clinical experience, the significance of behavior symptoms in the child, and to come in intimate association with the workers

from community organizations, many of whose problems are essentially concerned with the mental health of their clients.

While recognizing the importance of the mental hygiene clinic, which should not be disguised under another name for fear of using the word "mental," and looking upon the clinic as an essential unit in the mental hygiene program, it is not to be understood that all those who require mental hygiene service are to pass through a special clinic. Indeed, the only hope of bringing mental hygiene to the masses is through the medium of the general practitioner of medicine, the pediatricist, the well baby clinic, and the public health and social worker. The mental hygiene clinic should serve as a center for the diagnosis of difficult cases, referred by physicians, health and welfare agencies, schools, and courts, after which treatment will be prescribed to be carried out, in most cases by the referring individual or agency. Cases presenting unusual problems may be carried by the clinic staff.

The clinics should be centers from which would radiate, not only community leadership in mental hygiene, but also sound teaching and guidance. The clinic may also be used as an outpatient department of the hospital to supervise discharged and boarded-out cases.

So far, it will be noted that the program suggested for the provincial health department is the acceptance and inclusion of well tried and proved pieces of work in the mental health field. It is very questionable if official agencies should go any farther. It would seem better to leave to the voluntary health agency the responsibility for pioneer work in mental hygiene, and for the official department to absorb new items just as soon as the soundness and practicability of these are established, but not before.

Those who believe that parent education as regards its content and technic is sufficiently established to warrant its acceptance as an integral part of mental hygiene service will expect to have it included. Those of us who would like to see more consideration given to the subject before expressing approval of content and technic would prefer to leave parent education to the voluntary agency for the time being.

It is difficult to visualize public health progress without the leadership, stimulation, and criticism of the voluntary agency. The nonofficial should be complementary to the official. This is particularly true in a comparatively new field which seems so vast in its potentialities that it creates a feeling of helplessness in the minds of some.

The size of the problem should not daunt us for, in proportion to the size, results will be attained. What is justified is a spirit of caution which brings us to pause and to endeavor to ascertain what is to be done first of all, and what are the second and third steps.

We cannot wait forever to make sure that there will not be mistakes, but we can allow the voluntary agency to conduct the studies and demonstrations from which the official department may hope to learn the most effective means to attain its objectives.

It is for this reason that the official authority should encourage and support the activities of the voluntary mental hygiene organization in carrying out those functions which can be better dealt with by the voluntary agency.

To sum up, what I have said is this—Because we deal with individuals, mental hygiene cannot be divorced from physical hygiene; mental hygiene appears to be one of the public health activities which, at least outside of the larger centers of population, will have to be conducted on a provincial basis; the logical location of mental

hygiene in university teaching or in public health service is as a part of public health, given a full appreciation of the necessity for intimate association with other professional services; the program for the present should be limited to those items which experience has shown to be of value and which are administratively possible, namely, institutions for the treatment of mental disorders and for the training of mental defectives; there must be a program of public education and a definite provision for staff education, with promo-

tion of adequate instruction in professional schools; there must be organized mental hygiene clinics, staffed from the mental hospitals, to provide service and also to offer facilities for the clinical experience required to prepare the teachers needed for carrying out the educational program; for the time being, the program may be limited, and the voluntary mental hygiene agency encouraged to pioneer in this field, with the official department gradually absorbing tried and proved pieces of work.

American Red Cross Annual Roll Call

Armistice Day to Thanksgiving



Still the Greatest Mother

Physical Preparation for School Admission*

RICHARD A. BOLT, M.D., DR.P.H., F.A.P.H.A.
Director of Cleveland Child Health Association, Cleveland, Ohio

YEAR after year we continue routine physical examinations of children on school entrance. We find practically the same defects in about the same percentage of cases. We record the findings more or less accurately and completely. For various reasons we find it difficult to secure prompt and effective correction. Hampered by his defects it takes the child a year or two to adjust himself to the new order of things. This is decidedly harmful to the child as well as expensive to the school.

We know that children with depleted nutrition, with defects of sight and hearing, with dead or dying teeth, with enlarged and infected tonsils, cannot take full advantage of the educational procedures which are offered. School physicians and nurses are fully aware of this, and teachers soon recognize the relationship between poor physical condition and the ability of the child to measure up to standard in the daily program.

School medical inspection was among the first public health measures to be applied to children. As early as 1842 France issued a decree for school inspection by physicians. In the United States the first law relative to medical inspection was passed in Connecticut in 1899.

Since then we have accumulated a great deal of experience in developing routine medical inspection and in providing a follow-up by public health nurses; yet it must be confessed that in many places less real progress has been made in the early correction of defects and the inculcation of health habits than in any other phase of child health. Why should this continue?

The study of physical defects among school children in New York City, conducted by the Research Division of the American Child Health Association, showed clearly that a considerable proportion of the defects discovered during the course of routine medical examinations were not corrected. A number of pertinent questions were raised:

1. To what extent have school health staffs been remiss in following up the case and in impressing parents with its importance?
2. Is the lack of response on the part of parents due to apathy or neglect?
3. To what extent is lack of corrective facilities, within the financial means of parents, to blame?
4. Is it possible that the character of the examination in the first place has been responsible for unduly encumbering the records with matters which are not as serious as they appear? Is this one of the reasons why parents fail to respond? ¹

The failure to obtain results was due largely to the method of recording the defects, to a conflict of opinion which prevented continued follow-up, and to the fact that the parents did not coöperate with the school authorities in carrying out the recommendations.

* Read at a Joint Session of the American Association of School Physicians and the Child Hygiene Section of the American Public Health Association, at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

To this must be added the inability of many parents to pay full medical fees.

In a survey conducted by the National Organization for Public Health Nursing² an appraisal was made of the quality of work performed by public health nurses of 57 agencies in 28 communities throughout the United States. In order of quality this survey rated the nursing services as follows:

1. Prenatal care
2. Care of the sick
3. Postpartum and neonatal care
4. Health supervision of infants
5. Disease prevention including—
 - a. Tuberculosis control
 - b. Communicable disease control
 - c. Syphilis and gonorrhea control
6. Health supervision of preschool children
7. Health supervision of school children

It is significant that school health supervision should fall at the very bottom of the list. Nursing follow-up for school children undoubtedly has a good deal to do with the response of parents in having defects corrected.

Neither of these surveys, it seems to me, touches the mainspring of the difficulty. When the child enters school over 50 per cent of the opportunity to prevent certain communicable diseases is over. If suitable immunization measures were carried out in the preschool period there would be fewer cases of infectious disease arising in the schools. Many of the defects from which the child suffers in school have been acquired before school entrance and have remained unnoticed and uncorrected for such a long time that the parents have overlooked their importance. It is only in the school environment itself that the defects become noticeable. There they impede the progress of the child.

It is well known that the babies and infants up to 2 years of age, on the whole, have received exceptionally good care. This is the result of effective public health and preventive pediatric measures which have been continued

in spite of the depression. The great majority of children arriving at the age of 2 years have been under medical and nursing supervision and are in good condition. It is during the period from 2 to 6 that these children get out from under organized social control, and that the parents neglect to carry out measures necessary to prevent defects, or to have them corrected when they occur.

If preschool children were examined thoroughly by competent medical personnel and proper follow-up were instituted, there is no question that a great deal of the load of medical inspection during the first years of school life could be lifted. The children would gain immeasurably in having the defects corrected before school entrance; the school would be in a much better position to adjust the children earlier to its curriculum.

We have definite knowledge of the nature and extent of defects from which preschool children suffer. In many instances we are able to prevent or correct them. We have adequate professional skill to make the corrections. I am convinced the difficulty is not so much the lack of knowledge and proper technics to prevent many of the defects of childhood, or to correct them when they have occurred, as the lack of a properly coördinated system of child welfare to carry the excellent results which have been obtained in infancy over into the preschool and school years. If this could be accomplished we not only would help the children to better health and earlier school adjustment but an enormous amount of money would be saved which now is expended in attempts to get corrections carried out through the schools. The schools then would be in a position to devote themselves more to the health education aspects of health supervision.

The gap may be filled either by extending the work from the infant

welfare centers to cover the preschool child or by pushing back the school health work to join with the infant welfare. A continuous health record of the child from infancy through school life would be of great value.

The problem, therefore, resolves itself not into technical—medical, dental, and nursing—procedures; but into a program of community organization along socio-medical lines. Up to the present we have attempted to reach the preschool child through family physicians, general health work, specialized services in day nurseries and nursery schools, and sporadic efforts of preschool drives. Undoubtedly this has called to the attention of parents the condition of preschool children and has stimulated a certain number to have corrections carried out before school entrance; but it has been carried out in such a haphazard manner that it has reached only a small proportion of the preschool population. If we are to secure results for older children comparable to those in the infant welfare field, we must develop our program for the preschool group.

It is true theoretically that each family should have its own family physician and that the physician should follow the child right on through school. When it comes to a practical application of corrections, however, we find that not more than 10 or 15 per cent of the families can afford private physicians' services for preventive and corrective work.

Abundant experience has demonstrated that the most practical method of reaching large numbers of children at minimum cost is through well organized health centers. Another possibility, as has been suggested, is an extension downward of the school medical service. The kindergarten is still a feature of a number of the public school systems in America; but in many places it has remained bound to methods which have become antiquated. A number of kindergartens throughout the country, however, are transforming themselves gradually into what might well be called nursery schools.

England has found it possible through nursery schools to secure the correction of a great many of the defects of preschool children. If the kindergarten system of America extends its influence gradually downward, there is great opportunity for the medical service to concentrate on this period and thus secure the correction of defects at a much earlier time.

The excellent results secured by the health care of children in the best conditioned day nurseries and nursery schools give promise that a wider extension of preschool preparation for school will bring about desired results from the standpoint of parents, children, and schools.

REFERENCES

1. *Physical Defects—The Pathway to Correction*, American Child Health Association, 1934, p. 2.
2. *Survey of Public Health Nursing in the United States*, National Organization for Public Health Nursing, 1934.

Milk

YOU don't have to be a calf to enjoy milk, for there is no substitute for this indispensable food in the human diet. Use it, therefore, in liberal amounts in your daily diets, whether you want to slenderize or become more

ponderous, or merely want a protective food that will help to maintain the vigor and stamina of a comely and well-formed body.—James A. Tobey, Dr.P.H., Radio Talk, Milwaukee Annual Meeting.

Part the School Nurse Plays in the School Health Education Program*

ELMA ROOD, R.N.

*Associate in Charge of Health Education, Tennessee Valley Authority,
Knoxville, Tenn.*

A WELL KNOWN leader in public health work once gave this advice to his associates: "Whenever you are asked to outline a tentative program, set up your plan as ideally as possible, and then if you have to, cut it and modify it according to the conditions in which you must work," which is just another way of saying "Hitch your wagon to a star." If we put this advice into practice in outlining a program for the school nurse, we shall consider in this paper how the *best* school nurse in the most favorable school situation may be able to contribute most to the aims and purposes of general education and to the school health education program in particular.

Of course the term "best" is one which is subject to a great variety of interpretations depending largely upon the viewpoint of the person doing the judging. No two people in the world may agree on the requirements for "best." Perhaps no two people would agree on what is "best" as applied to a school nurse. Most people would be influenced indirectly in giving an opinion by the many and well known controversial questions bearing on this subject. This topic does not call for

a discussion of these unsettled problems; however, no opinion of the way in which the school nurse may do her best work can possibly be expressed without touching upon some important and controversial issues.

There are two major factors out of the many that condition the work of the school, which influence the contribution that the school nurse can make to the health education program. The first of these factors is the nurse herself, her personality, preparation, and experience. The second factor is the school, its leadership, philosophy, scope, and the vision of the teaching staff.

First let us consider the nurse and some personality traits that will be likely to contribute greatly to her services. Excellent health—physical, mental, and social—and an abundance of energy and good nature help her to be a constant teaching example. She likes people and is able to work harmoniously with them. She especially likes and enjoys children, and her attitude on this point is apt to influence the whole school health program. Mental alertness, initiative, courage, stick-to-it-iveness, and a moderate amount of aggressiveness are all qualities which help her to find and develop latent possibilities in the school field. Needless to say, enthusiasm for and belief in her work

* Read at a Joint Session of the American Association of School Physicians and the Public Health Education Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

color her personality and influence all of her contacts.

The preparation of this school nurse for her work is likewise of great importance. She has a good background in general education, especially in the biological sciences. She has had excellent basic health training in which she has gained an understanding of the growth and development of normal children and of methods of conserving and protecting this development. She has had a course in community health in which the major emphasis was placed upon the educational aspects of the public health field rather than upon the clinical. She has a thorough knowledge of and ability to apply principles that govern the teaching and learning processes, and these principles are in accord with the most enlightened ideas on education. She understands and appreciates the teacher's work and influence with children and with parents, and in addition she has ability to inform herself on the content of the curriculum, and the extra-curricular activities which are found generally now in the public schools. This gives her a valuable background for advising on ways to integrate health into the child's day. Contacts with normal children have been obtained in a nursery school, summer play school, or camp, or possibly in teaching experience, and this is an invaluable background for community work. These contacts have modified the approach and attitude so often developed through caring for sick children. She has also had experience in the generalized public health field and this has given her a very good idea of the whole community program of which school health is a special and important phase.

In addition to this preparation the nurse is constantly studying to keep abreast of a rapidly developing field. Whenever she has realized a weak spot in her preparation, she has reinforced

this point with a summer course or a special line of experience.

The preparation and background of this nurse is thus equal to or greater than that of the teachers with whom she works, so that she is fully acceptable to them in the capacity of consultant and adviser. This relationship is of tremendous importance and can hardly be overestimated for its effects upon the program.

Now let us see what factors there are within the school itself that favor the maximum contribution of the school nurse. We must recall again that "best" is an unknown quality when applied to the school also, but that research in education and its outcomes in terms of growth and development of children, seem to indicate certain trends in general education that are increasingly acceptable to experienced leaders in this field, and that should be applicable to health education since this represents a very closely interrelated phase of all education.

The first factor in the school that exerts an influence upon the work of the school nurse is found in the school administrator. As the educational leader he determines quite largely the philosophy that shall guide the learning process, and because he appreciates that his staff should have a clear-cut understanding of this educational philosophy, early in the school year some basic principles are evolved and interpreted such as, for instance:

Each child to be encouraged to do his best and to have such experiences as will help him to do this; each child to have opportunities to exercise originality, initiative, and responsibility in deciding questions or problems that arise in his own life; each child as a member of a social group to have a part in initiating, planning, executing, and judging in coöperation with others; each child to meet the problems of life daily in the classroom,

and so to be ready for the broader and more responsible life of the community in which he must take an increasingly active part.

Such a philosophy welcomes health as a quality which is associated with many experiences of living. It becomes a part of this philosophy that each child shall be intelligent, voluntarily coöperative and, as far as possible, self-directing on every health procedure. To accomplish these aims requires the highest type of education.

The scope of the school program influences directly the breadth of the work of the school nurse. This school is extending its influence in two directions, downward in the interest of the young children who represent the future school population, and upward and outward to the adult members of the community. Therefore it no longer represents an institution only for children, but leads out into the growth and development of the whole community. This type of community program is an open door to the kind of health education that will be a challenge to the school nurse.

We have named last among the factors that influence the work of the nurse, the vision of the teaching staff. It is a question whether this factor does not deserve the leading place from the standpoint of its potentialities. The teacher with vision sees each child as a person—whom she must know very well if she is to contribute her maximum to his development. She constantly tries to broaden the child's experiences and so pulls in those activities that will help him most to grow. She finds and welcomes situations that require personal and group decisions since these give the child practice in intelligent thinking and judging. She knows that environments sometimes change completely under a child's fingers, and that the attitudes of a whole community may be touched by a child's interests and

feelings. She recognizes that health is something that functions in the classroom every hour of the day, that it follows a child into his home and out into the community, and that she must be alert to find the learning opportunities in this broad experience and to make them alive and meaningful.

With such vision what better ally can the school nurse have than the classroom teacher!

Now that we have our setting for this school nurse let us see how she plays her part in a community health education program, in which the common barriers of age and subject are removed so that health can effectually penetrate into public consciousness as one determiner of effective citizenship.

Recognizing that she is engaged in the most potentially far-reaching and constructive phase of the public health program of the community, she has established early and close contacts with the organized health department, not only as a means of instituting measures for the protection of the school, but to gather suggestions on basic problems which may be incorporated into the learning of children.

In her official reports to the health department she is constantly interpreting health as an aspect or modifier of social and economic problems, rather than as a subject, and as a quality so tied to many interests in the community that she does not expect nor desire that every educational effort bearing on health should be so labeled. In discussing results to be sought, she illustrates concretely that by far the most valuable outcomes in the form of feelings, desires, and attitudes, are often of an intangible nature, not subject to rating by the ordinary type of appraisal form, or capable of being totalled on an adding machine.

She keeps the health department informed regularly on health conditions and progress, and obtains advice on

necessary technical steps to be taken. She counsels on ways in which services to be rendered by doctors and nurses may be of the maximum educational value. She serves as the go-between for the school and the health department in making use of community resources in the interest of children, and in carrying out special directions in times of emergency. She works closely with the official health department on plans for reaching the preschool group, taking an active part in such adult courses as are built around the problems of the young child. She also plans with the teachers to make the preschool work as far as possible a part of the social training of school children.

She assists in the preparation of educational material for use in the Parent-Teacher or other organizations on such subjects as bear on child health and protection, and takes part in incorporating this knowledge into the understanding of the community.

She is constantly interpreting to adult groups the needs of children and what the school is doing throughout the entire day to meet these needs, and through these contacts she finds and develops lay participation in all health services rendered to the school.

Her contact with the teachers is close, friendly, and cordial, and a spirit of helpfulness pervades all services rendered. She is personally interested in the health of each member of the teaching staff and sometimes talks over with them their everyday health problems. She is constantly alert to see dangers or hazards, whether physical, mental, or social, as these may affect any one in the school, and quick to bring these to the understanding attention of the school administrator or teacher. She works closely with all departments of the school in bringing about the most wholesome environment, emphasizing the possible educational value of all problems to the pupils.

In all contacts with children she aims to be an example of health, and she plans ahead to make all these contacts as meaningful as possible.

In her relationship with parents she serves as an adviser, and constantly interprets the needs of and services rendered to children at different stages and phases of development. Believing that parents usually receive and act more readily upon advice which they seek, she fosters and develops a parents' consultation service at the school where constructive advice on child problems may readily be obtained.

At the beginning of each year the attention of the school is called to the value of an early inventory of health needs as a basis for a constructive program for the year. The nurse assists the school in arranging for health examinations of children, and plans definitely to have this procedure understood by teachers, pupils, and parents.

On the basis of the health inventory the nurse interprets the constructive work that needs to be done, especially calling attention to the importance of having the understanding and coöperation of the child whenever possible and advisable.

When follow-up work is begun the nurse supplements and reinforces the teacher's knowledge of the problem, by giving her pertinent information on home and community conditions affecting that specific problem. She also keeps the school informed on current scientific discoveries significant to an understanding of child problems, and on source materials of value to the teachers or for use by the pupils in special studies. She frequently passes over to the teacher the knowledge she has gained from her first-hand field experience with local conditions.

The school nurse is interested in every phase of community work, and is alert to discover and commend associations which are built with any phase of

health. On such subjects as require some technical training such as home care of the sick, or first aid, she takes an active part in instruction, in the school to assist the regular teacher to carry it on more effectually after the demonstration is over, and in the community, to develop ability to conserve and build health in the home.

Activities mentioned thus far are concerned primarily with well children. In every school there are those who need special provisions either for physical reasons or because of some mental or social difficulty. To solve the problems of such children often requires the coöperation of many agencies and the nurse is ready to make her contribution to any constructive program outlined for an exceptional child. She follows up such recommendations as come within her field, and helps to secure understanding coöperation in the interest of the child's welfare.

The nurse contributes all data possible on the health history and status of each pupil, as a part of the cumulative record which shows all phases of his growth and development and which accompanies the child throughout his school life. As these histories grow, she prepares material in the form of graphs or charts to help the school better to see its health needs, its progress, and the problems on which special emphasis may be indicated.

As the school grows in its awareness that health is associated with all phases of its program, the nurse becomes increasingly an adviser on the health aspects of such activities as the school lunch, swimming pool, picnics, field trips, excursions, hikes, and contributes to the educational phases of these whenever possible.

From the illustrations which have been given it is seen that this school nurse is primarily an educator with a special background in the field of health, one who serves not only as a

guide to teachers, but as a teacher of parents; one who successfully coördinates school health with the public health work of the community, and merges her contribution into the coöperative program aiming to raise the level of child health and intelligence; one who does her part in making the school become the focus for the health educational work of the entire community.

The outlining of this program may stimulate questions as to its practicability, soundness, and economy—such questions, as, "Where could a school nurse be obtained to carry on such a program?" "Will school boards afford to employ such a person?" "Is it possible to carry such a program in a generalized service?" "Is it as worth while to provide a special health service for children as it is to provide a special service for workers in industry?" "Would the school physician, if there is one, welcome such a person in the school?" "Would it pay the community in hard dollars and cents to have this service as a part of the educational system?"

Some nurses may feel that this program is entirely too far away from present practices and standards in school nursing. Others may wish to start at once to prepare for just such a service, confident that opportunities open to the person who is well prepared. It is likely that this ideal is within reach of many nurses at present in the field who have a clear vision of its possibilities and determination to secure the necessary preparation, and experience.

Judging by the way in which other civic enterprises have grown because a vision has been translated into action, it would be reasonable to predict that such school nurses will be developed, as individuals catch the vision of the potentialities in this field, and realize the truth and tremendous significance

of the statement made at the White House Conference to the effect that "civilization moves forward on the feet of little children." Training facilities always materialize in proportion to the demands of the field. So far the demands for this type of service have come mainly from school administrators, many of whom realize the needs but have not succeeded in establishing such a program for lack of adequately trained personnel. There needs to be built a greater appreciation on the part of public health nurses that the education of the school child as a citizen

in the making, is building not only for present, but for future generations, and that by this means only 'will we solve many of the public health problems which now absorb so much of the time and energy of health workers with so little in permanent returns, that we must change our program from one which is largely corrective and palliative to one which is positive and constructive.

The school nurse who prepares herself to take part in such a program will be a contributor to the most advanced steps being taken in the public health field.

Swope Appeals for Health Fund

WITH more than one-third of the public health work in the United States supported by contributions to community chests and other private services, only \$1 per capita from both public and private funds is being spent for public health work in the nation, it was pointed out by Gerard Swope, chairman of the 1935 Mobilization for Human Needs.

Mr. Swope based his figures on a report submitted by the National Health Council, whose agencies are coöperating with the Mobilization. He pointed out that sound public health work required an expenditure of from \$2.50 to \$3 per capita annually.

Mr. Swope, who is president of the General Electric Company, made it clear that about one-third to one-half of the budget appropriated from tax money for public health went to support nursing services and that this was greatly increased by money provided by private health agencies for nursing service.

Exclusive of private-duty nurses,

there are in the United States about 20,000 public health and bedside nurses, of whom 40 per cent are paid for by private agencies, Mr. Swope declared, asserting that there were only one-sixth as many public health nurses in the United States as there should be. . . .

Much has already been done to reduce preventable diseases and epidemics and to prolong life, but much remains to be done in the fight to banish disease. Money can do it; money pays for nursing service, hospital and clinic treatment, public sanitation and food protection, and other measures for making better community health.

In the realm of public health there is, this year, great need for the private health agencies supported by money from community chests and other private sources.

To acquaint the public with the true health situation in this country, a campaign has been launched this fall under the sponsorship of the National Health Council, to hold in more than 400 cities of the United States town meetings to discuss matters of community health. In each city the meeting will be preceded by a community-wide inquiry into community health conditions.

—*New York Times*, Oct. 15, 1935.

Frequency of Immunizing Procedures of Various Kinds in 9,000 Families Observed for 12 Months, 1928-1931

SELWYN D. COLLINS, PH.D., F.A.P.H.A.

Office of Statistical Investigations, U. S. Public Health Service, Washington, D.C.

IN connection with a study of illness and medical care in a group of nearly 40,000 persons, made by the U. S. Public Health Service in coöperation with the Committee on the Costs of Medical Care, information about the various immunizing procedures was recorded. The data were collected through periodic calls to the homes by visiting nurses for a sufficient time to obtain a 12 month record of illness and medical care. All immunizing procedures reported as occurring during the year were recorded and for four diseases information was obtained about the history of artificial immunization prior to the study.

The 8,758 white families surveyed lived in 130 localities in 18 states and represented all geographic sections of the United States. Every size of community was included, from metropolitan districts to small industrial and agricultural towns and rural unincorporated areas. The observed group was fairly similar to the general population with respect to age and sex composition, percentage native born, and percentage married. With respect to income, the distribution was reasonably similar to the estimated distribution of the general population of the United States at the time of the survey. More details about the canvassed families are given in preceding reports.¹⁻⁷

Figure I shows the proportion of persons of specific ages who had been artificially immunized against smallpox, diphtheria, scarlet fever, and typhoid. These curves are cumulative in nature because they consider immunization* at any time in the individual's life. If the frequency of immunizations has

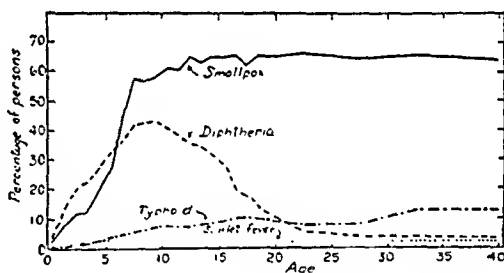


FIGURE I—Proportions of persons of specific ages who have ever been artificially immunized against certain diseases—8,758 white families, including 39,185 individuals in 130 localities in 18 states canvassed between 1928 and 1931.

In the absence of changes in past years in the frequency of the immunizing procedures, the curves would rise continuously; the use of diphtheria and scarlet fever immunization among children has increased in recent years and more children than adults give histories of such procedures.

* "Immunization" is used in this paper to mean the usual procedure for producing artificial immunity to a particular disease, such as toxin-antitoxin for diphtheria. All cases receiving such service are designated as "immunizations" whether or not the process actually produced immunity in the individual, except that histories of smallpox vaccinations are exclusive of unsuccessful vaccinations.

not changed in past years, the curves may be thought of as roughly corresponding to an accumulation of persons who have received artificial immunizations in a population kept under observation from birth to middle life. However, in the case of diphtheria, at least, the frequency of immunizations has changed; persons above 25 years at the time of the survey had passed the age of greatest susceptibility to the disease before the use of diphtheria toxin-antitoxin became widespread, and few persons of these ages have ever been artificially immunized. The same is true of scarlet fever, but there are so few immunizations at any age that the curve does not show the change so well.

In infancy and the preschool ages a higher percentage of the children had been artificially immunized against diphtheria than against smallpox. This finding is in agreement with that of the White House Conference report on preventive procedures in preschool children.⁸ In this country, however, a great many children are vaccinated for the first time when they enter school, and above 6 years the proportions vaccinated against smallpox greatly exceed those artificially immunized against diphtheria.

Smallpox vaccinations reach a maximum level of about 66 per cent by 16 years of age, after which there are relatively few primary vaccinations. Diphtheria immunizations reach a maximum of 43 per cent at 9 years; the reasons for the decline thereafter have already been discussed. Typhoid immunizations reach 10 per cent by about 17 years of age, with a second maximum of 12 per cent at 30 to 45 years which probably reflects the compulsory immunization of males in the military services during the World War. Scarlet fever immunizations reach a maximum of 4 per cent at about 13 years of age.

The curves in Figure I cannot be taken as representing active immunity at the time of the survey, particularly in the adult ages, because: (1) Many of the immunizations were done in childhood and never repeated; of the persons 20–24 years of age, only 19 per cent had been vaccinated against smallpox within 7 years, and at 35–44 years only 11 per cent had been vaccinated within that time. (2) Schick and Dick tests indicate that a large percentage of adults have developed immunity to diphtheria and scarlet fever without any artificial procedure or recognized attack of the disease. (3) The curves represent histories of artificial immunizing procedures and do not include histories of cases of the disease. In the older ages, histories of typhoid fever cases are about as frequent as histories of artificial immunization; among persons 35–44 years, 8 per cent gave a history of a case, and 12 per cent gave a history of an artificial immunizing procedure without a case; above 45 years, about 10 per cent gave a history of a case. In smallpox, only about 5 per cent of adults gave a history of the disease as compared with 66 per cent who had been vaccinated but had not had the disease. In diphtheria and scarlet fever the histories of recognized attacks are small as compared with the number who show im-

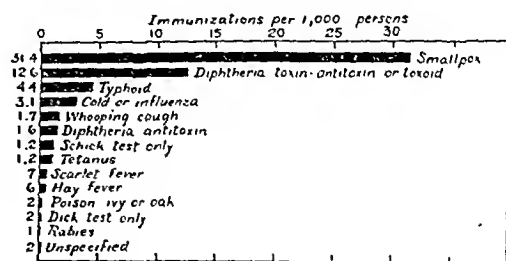


FIGURE II—Annual artificial immunizations against various diseases per 1,000 population under observation—8,758 white families canvassed periodically for 12 consecutive months, 1928–1931. (Rates based on 38,544 full-time person-years of life.)

munity by the Schick and Dick tests, but are not small as compared with artificial immunizations. At 13 to 15 years of age 13 per cent of the children gave a history of scarlet fever attacks as compared with 4 per cent with a history of an artificial immunizing procedure. At 9 years when the history of diphtheria toxin-antitoxin or toxoid was at the maximum of 43 per cent, 4 per cent of the children gave a history of recognized attacks of diphtheria. Among adults, about 7 per cent gave a history of diphtheria.

Figure I represents average percentages for the whole group of surveyed persons. In smallpox there are large differences in vaccinal status between the cities and rural areas. In cities of over 100,000 population, about 86 per cent of adults have been vaccinated as compared with 44 per cent of adults living in the open country. The proportions for towns under 5,000 and for cities of 5,000 to 100,000 population fall logically between these limits. Variations in different geographic sections were not so large.

Typhoid immunizations are more common in the rural open country and are least frequent in cities of over 100,000. The greatest variation, however, is geographic; among persons 15-19 years of age living in the surveyed southern states, 31 per cent had been inoculated against typhoid fever, as against 3 to 5 per cent in the other three sections into which the surveyed states were classified.

Urban-rural and geographic differences were not so striking in the case of immunizations against diphtheria and scarlet fever.

The only significant variations as between the sexes occur in typhoid inoculations among adults; the considerably higher frequency among males is presumably the result of compulsory immunization of men in the military services during the World War and since

that time in training camps and the like.*

Data for the 12 month period during which periodic visits were being made are presumably more accurate than the histories covering the whole past life. Figure II shows for this period the frequency of artificial immunizations of various kinds per 1,000 persons under observation. Schick and Dick tests made without prior or succeeding immunization during the year and diphtheria antitoxin administered to contacts are also included. Of the total of 2,279 immunizing procedures, 1,209, or 53 per cent (31 per 1,000 persons under observation), were smallpox vaccinations and another 487, or 21 per cent, were diphtheria immunizations. Typhoid immunizations are third in frequency with inoculations of cold vaccine not far behind. All procedures purporting to immunize against any disease are included; this study deals with the frequency of their use and not with their efficacy.

The cases of antitetanic immunization amounted to only 1.2 per 1,000 persons under observation, or 1.7 per cent of all accidents that were reported. The use of antitetanic immunization was largely confined to injuries by cutting and piercing instruments, 6.8 per cent of such injuries being followed by antitetanic vaccination.

Hay fever immunizations amounted to 0.6 per 1,000 persons under observation, or 11 per cent of the 226 cases of hay fever or asthma that were reported. Of the 76 cases reported as hay fever, 25 per cent had some immunizing inoculations during the year, but only 4 per cent of the cases reported as asthma had such inoculations. The percentage of hay fever cases receiving immunizing extracts seems large; it is probable

* More data on the variation of vaccinations and immunizations in cities of different sizes and in geographic areas will be included in forthcoming articles in the *Public Health Reports*.

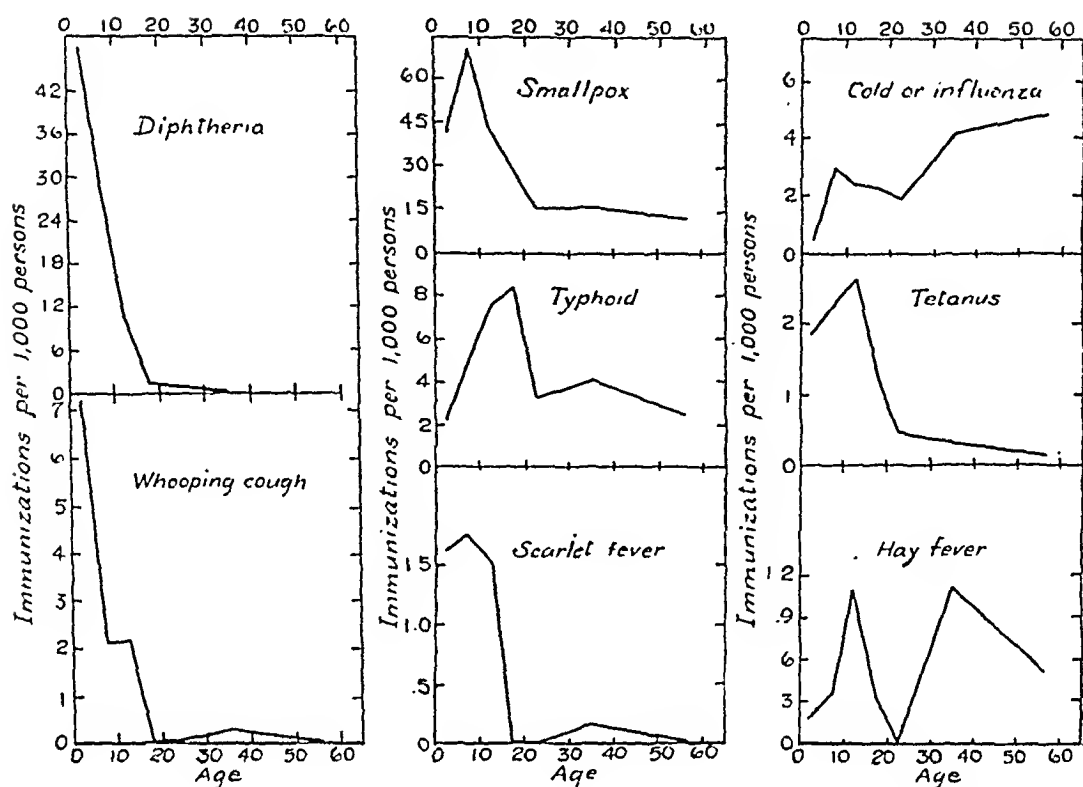


FIGURE III—Annual artificial immunizations against certain diseases per 1,000 persons of specific ages—8,758 white families canvassed periodically for 12 consecutive months, 1928-1931.

that many mild cases of the disease that received no medical care of any kind were not reported.

Figure III shows, for the immunizations that occur more frequently, the rates for persons of specific ages. The data are plotted in 5 year classes to 25 years—an age grouping which shows essentially the same curves as would narrower age classes. Diphtheria immunizations during the study year were more frequent under 5 years than at any other age. Smallpox vaccinations, however, reach a peak at 5-9 years, the frequency being about the same under 5 as at 10-14 years. Typhoid immunizations are much more frequent from 10 to 20 years than at any other age. Scarlet fever, whooping cough, and tetanus immunizations are also confined largely to children. Cold vaccine has a small peak in childhood but the rates are higher in the older

ages. Hay fever immunizations show peaks of approximately equal size in childhood and about 40 years of age; although the numbers are small, the curve is probably fairly correct since these two peaks correspond roughly in age to peaks in the incidence of hay fever as reported in these families.⁶ The percentage of hay fever cases reported as taking immunizing treatments is twice as high for persons under 20 years as for adults over 20 years of age. In the case of tetanus also, the per cent of cutting or piercing accidents that were followed by antitetanic immunization was much higher for children than for adults.

SUMMARY

1. Between 60 and 70 per cent of adults have been vaccinated against smallpox at some time in their lives.
2. The present rate of artificial

diphtheria immunizations will eventually result in about half of the adult population with a history of such a procedure.

3. In the preschool ages a smaller percentage of children are vaccinated against smallpox than are immunized against diphtheria.

4. Immunizations against typhoid are more frequent in the South than in other sections of the country.

REFERENCES

1. Collins, Selwyn D. Causes of Illness in 9,000 Families, Based on Nation-wide Periodic Canvasses, 1928-31. *Pub. Health Rep.*, Mar. 24, 1933 (Reprint 1563).

2. Collins, Selwyn D. Frequency of Health Examinations in 9,000 Families, Based on Nation-wide Periodic Canvasses, 1928-31. *Pub. Health Rep.*, Mar. 9, 1934 (Reprint 1618).

3. Collins, Selwyn D. Frequency of Eye Refractions in 9,000 Families, Based on Nation-wide Periodic Canvasses, 1928-31. *Pub. Health Rep.*, June 1, 1934 (Reprint 1627).

4. Collins, Selwyn D. A General View of the Causes of Illness and Death at Specific Ages, Based on Records for 9,000 Families in 18 States Visited Periodically for 12 Months, 1928-31. *Pub. Health Rep.*, Feb. 22, 1935 (Reprint 1673).

5. Collins, Selwyn D. Age Incidence of Illness and Death Considered in Broad Disease Groups, Based on Records for 9,000 Families in 18 States Visited Periodically for 12 Months, 1928-31. *Pub. Health Rep.*, Apr. 12, 1935 (Reprint 1681).

6. Collins, Selwyn D. Age Incidence of Specific Causes of Illness, Based on Records for 9,000 Families in 18 States Visited Periodically for 12 Months, 1928-31. *Pub. Health Rep.* In press.

7. Falk, I. S., Klem, Margaret C., and Sinai, N. The Incidence of Illness and Receipt and Costs of Medical Care Among Representative Families. *Publication No. 26*, Committee on the Costs of Medical Care, 1933.

8. Palmer, George T., Derryberry, Mahew, and Van Ingen, Philip. Health Protection for the Preschool Child, Report to the Section on Medical Service, *White House Conference on Child Health and Protection*. 1931.

The General Reader

SCIENTIFICALLY and philosophically trained writers apparently have no idea how hard their books and articles are for the general reader; how much is included that few can appreciate; how many statements are dark and unintelligible to those for whom the book is ostensibly designed. An encyclopaedia or dictionary would seem to be compiled especially for the benefit of the public who are urged to buy it. But the seeker for knowledge who happens to have his curiosity aroused

in regard to the polarization of light will find the article in the *Encyclopaedia Britannica* beginning: "A stream of light coming directly from a natural source has no relation to space except that concerned in its direction of propagation, round which its properties are alike on all sides." Like the lovers in Dante's *Commedia*, the simple inquirer is likely to read no farther that day.—James Harvey Robinson, *The Humanizing of Knowledge*, 1924.

The Known and Unknown of *Bacillus Pertussis* Vaccine*

LOUIS SAUER, M.D., PH.D.

Northwestern University Medical School and the Evanston Hospital, Evanston, Ill.

DANISH State Serum Institute investigators and clinicians have made valuable contributions on *B. pertussis* vaccine since 1916. Miller¹ says:

The strains are kept on Bordet-Gengou medium until inoculated on the "vaccine medium" (3 parts nutrient agar (calf), 2 parts potato-glycerin agar, and 2 parts defibrinated horse blood). The 3 day growth is washed into 1 per cent formalin in physiological sodium chloride. After formalization for 1 week the suspension is centrifuged, resuspended in 0.5 per cent phenol in physiological sodium chloride and standardized to 10,000 million bacteria per c.c.

For nearly 20 years a standard technic has been in use—the total dosage of 2.2 c.c. is divided into 3 injections (0.5, 0.7 and 1.0 c.c.), given at intervals of 3 or 4 days. Madsen,^{2,3} found this ineffective as a curative agent; given as a prophylactic, 1 to 3 months before exposure, it failed to prevent the disease in 364 nonimmunes. The course was more frequently mild, however, and the percentage of deaths was lower when injections were completed a few weeks before symptoms appeared. Discussing F. McDonald's⁴ summary on *B. pertussis* vaccine, R. Smith⁵ cautions against hasty con-

clusions on pertussis immunization. He says:

Pertussis is such a dread disease that physicians and parents easily take "the will for the deed" so far as proof in relation to prevention is concerned. Enthusiasm has waxed and waned many times. . . . One is certainly justified in using vaccine in an attempt to produce immunity against whooping cough, but one must be honest with himself and with his patients in acknowledging that proof of its protective efficacy is lacking. One must guard against drawing conclusions from a few cases, from clinical impressions, or from uncontrolled statistical reports.

When whooping cough occurs during the first few years of life, its course is often influenced by age, previous health, nutritional state, stability of the nervous system, hygienic care (aseptic nursing), climate and season. In the vaccinated and nonvaccinated the duration and severity often vary greatly. In a crucial study of immunization only nonimmunes between 8 months and 3 years of age should be used. Children should be excluded if they ever had any persistent cough. The very young may not yet possess the power to elaborate immunity from injected antigen, regardless of its potency and dosage; children over 3 may require a larger dosage of antigen, or may already be immune. Because the communicability index for pertussis is about 75 per cent, appreciably more than 25 per cent of the vaccinated should escape the disease

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

when they are definitely exposed to infection. Exposure to infection is more likely to be early, intimate, repeated and prolonged when it occurs within the family. The best controls are, therefore, the nonimmune (nonvaccinated) siblings. Exposure occurs more frequently outside, but doubt may exist when vaccinated nonimmunes escape such transient exposures. Did the patient disseminate bacilli at the time of contact? did the vaccinated child aspirate bacilli? or, was the child immune before vaccination? Diagnosis should be verified by cough plates, repeated white cell and differential white cell blood counts. Of importance is the duration of the cough before exposure of the injected child occurs—also the time interval between vaccination and exposure. Because specific serologic tests are not an index of immunity, and without a reliable skin test,⁶ the ultimate test of immunity is exposure to infection.

Between 1928 and 1932, 394 selected young nonimmunes, average age about 14 months, were injected with an especially prepared *B. pertussis* vaccine.^{7, 8} Each child was injected with a total of 7 to 8 c.c. (approximately 70 to 80,000 million bacteria). Thirty intimate (familial) exposures to the disease in siblings have occurred; and 169 of the vaccinated children have been exposed (?) a total of 360 times in 7 years. No child injected with this Evanston vaccine has contracted typical whooping cough. A frail girl of 2 years, injected soon after recovery from measles, developed a very mild cough (1 cough plate positive, blood findings repeatedly normal) within 3 months after she had been injected with a total of 7 c.c.; her brother (control) was convalescing from typical pertussis at the time. In 1933, Macdonald and Macdonald⁹ reported important inoculation and exposure experiments on humans.

Two commercial laboratories were authorized by Northwestern University Medical School to make this vaccine according to detailed specifications. Freshly isolated, hemolytic strains are sent to them monthly; fresh, defibrinated human blood is used in the Bordet medium; the 3 day growth is scraped off; it is not washed; 0.5 per cent phenol in physiologic sodium chloride is used as preservative and diluent; the sterile product is standardized to contain approximately 10,000 million bacteria per c.c.; it is refrigerated until transported. Jobber, druggist, and physician are cautioned to keep it cold. Table I is a summary of vaccinations with approved commercial vaccines since 1932.

Thirty-three physicians in 19 states have reported a total of 2,945 vaccinations with approved commercial vaccines. The average age of their patients was well over 3 years. Seven children of 3 physicians, and a nurse, were willfully, intimately, and repeatedly exposed to the disease without contracting it. Only a few of the physicians ascertained the instances of exposure, but all reported their failures. A total of 130 known exposures and 21 failures were reported. Most failures occurred in children well over 3 years of age.

The prompt decrease in the incidence of typhoid fever in the Army and Navy, coincident with compulsory antityphoid vaccination in 1912, is accepted as evidence of effective specific immunization. Although typhoid vaccine has been perfected since then, the dosage augmented, and general hygienic measures have improved, typhoid fever still occurs in some of those exposed after vaccination. An authority recently estimated such failures at about 10 per cent. At first, toxin-antitoxin immunization against diphtheria failed to protect about 30 per cent of the injected children. Soon after scarlet

fever immunization was introduced, the number of injections was increased to 5, and the strength of the toxin appreciably increased. With the hope of decreasing the percentage of failures in pertussis immunization, children over 3 years will probably require a total of 10 c.c. or more of the approved commercial vaccine. One, 2, 2 c.c. would then be given in each arm, in 3 consecutive weeks.

Little is known about the factors which may cause failure—the antigen may be impotent when injected, or the individual may not possess the power to develop immunity. Little is known about the stability of the fraction which confers immunity. Endotoxin, prepared according to Besredka's method as described by Bordet¹⁰ was found to contain living *B. pertussis*. Mishulow, Mowry, and Scott¹¹ obtained a toxic filtrate from bacilli grown on horse-blood chocolate-agar with 1 per cent horse-serum beef-heart broth added. They produced the Schwartzman phenomenon with it. Gundel, Keller, and Schlüter⁶ prepared an endotoxin which was very toxic for rabbits and mice; skin tests with dilutions of it showed no specificity; nor was its necrotic action neutralized by the addition of convalescent pertussis serum. Regarding Krueger's¹² endo-antigen, McDonald says: "If the filtrate is water-clear, is one certain that 'cell metabolites' are the only masses filtered out?" Miller's recent complement fixation tests on rabbits, within a few weeks after undenatured endo-antigen was injected, seem to compare favorably with parallel tests on rabbits injected with the Danish vaccine. The relative impotency of the vaccine might be attributed, at least in part, to denaturation effected by the 1 per cent formalin. Truschina, Pechletzka and Murawjewa¹³ maintain that their bouillon culture filtrate purified by Huntoon's method, contains

soluble toxin which possesses specific antigenic properties. Dilutions of it produced positive skin tests more frequently in the nonimmune than in the immune.

No one has shown that immunization is possible with vaccine made from old stock strains, grown without blood. Leslie and Gardner¹⁴ maintain that "Phase I" strains yield the best antigen. Until it is known with certainty whether some strains yield more potent antigen than others, it is advisable to use recently isolated, hemolytic strains. They may probably be used as long as they fulfil the requirements of Leslie and Gardner's Phase I strains. It is of economic importance to learn whether other bloods, e.g. sheep, in the culture medium for general use by health departments, orphanages and foundling homes, will yield a safe and potent vaccine. The Michigan State Health Department vaccine, made with sheep's blood, is washed, that of the New York City Health Department is not washed. The work of Kendrick and Eldering¹⁵ and that of Park and Mishulow should determine, within a few years, whether safe and potent vaccine can be prepared without human blood.

The Helber counting chamber, with the vaccine diluted with Callison's fluid, probably yields more constant checks than the Wright or Harrison methods. Uniformity of the vaccine is important, but methods applicable for washed vaccines (Hopkins's tube) yield different counts when compared with unwashed vaccines of identical opacity. The Nephelometer has advantages after an accurate standard has been established, but the latter should not change color in the course of time. The Danish method of carefully matching the density of each new lot of vaccine with a well guarded standard tube of vaccine is simple, quick, and relatively accurate. It is our method of choice.

TABLE I
SUMMARY OF VACCINATIONS WITH 8 C.C. OF APPROVED COMMERCIAL VACCINE

	Number of Injections	Known Exposures	Failures	Age	Interval Between Injection and Exposure	Per Cent Protection
Private Patients (1932 to Sept. 1, 1935)	458	Familial 13 Casual 27	Gilroy Gilroy Kelly Mathews Pick	4 yrs. 7 yrs. 3 yrs. 4 yrs. 6 yrs.	6 mos. 6 mos. 2 yrs. 1 yr. 20 mos.	87.5
Evanston Health Department (1934 to Sept. 1, 1935)	604	Familial 14 Casual 50	Johnson Keefer Spencer Spencer	9 mos. 3 yrs. 2½ yrs. 4 yrs.	8 mos. 8 mos. 5 mos. 5 mos.	93.4
2 Orphanages	242	23	Trush	9 mos.	8 mos.	95.0
Total	1,304	127	10	Av. 3½ yrs.	Av. 8 mos.	Av. 92.0

Although some children may develop immunity within a shorter period of time, our records show that most children require somewhat more than 3 months for complete immunization. Lymphocytosis, quite like that of pertussis, often occurs within a month after vaccine injection. To give the 3 bilateral injections at shorter intervals (e.g., the 8 c.c. completed within a week) might hasten the immunity response. Work along this line is in progress.

Because whooping cough is a disease of early life, and as most of the deaths occur during the first 2 years, it is desirable to immunize as early as possible. Four hundred ("Cradle") infants, less than 6 weeks of age, have been injected with a total of 6 c.c. of the approved commercial vaccines. Since December, 1934, 168 have been given a total of 8 c.c. They withstand the injections remarkably well. There have been 9 subsequent exposures. Four of the children escaped, the other 5 contracted mild pertussis. It therefore seems that the best age is between the 6th and 8th month of life.

Warmth accelerates chemical change. Interrupted refrigeration, as during transit, a month on the druggist's shelf, or a few weeks in the physician's bag, acts deleteriously. Mishulow, Oldenbusch, and Scholl¹⁶ elicited comple-

ment-fixation reactions with the serum of rabbits, injected with *B. pertussis* vaccine that had been stored for several years at 8 to 10° C. Uninterrupted refrigeration of biological products is a desideratum.

Physicians inquire about the best sequence for immunization procedures and the importance of spacing. Fishbein¹⁷ says:

Perhaps the best plan would be to allow 4 months to intervene between successive immunization procedures. Because whooping cough causes more deaths in children under 2 years of age than diphtheria, measles, and scarlet fever combined, it is prudent to immunize first against whooping cough—preferably during the second half year of life. Four months later a single alum toxoid injection against diphtheria may be given. Four or more months after, when the Schick test is done, preferably in the spring or autumn, the smallpox vaccination may be done.

Very little is known about the effect of other diseases on the immunity response from injected pertussis vaccine. Two failures occurred in children who were injected with the approved vaccine soon after recovery from measles; another occurred in a girl of 6 who was injected soon after recovery from mumps; 20 months later she contracted typical pertussis. Her injected brother, who did not have mumps, escaped pertussis, although intimately exposed to her for weeks.

SUMMARY

Bacillus pertussis vaccine; like typhoid vaccine, is an immunizing, not a curative, agent. A time interval of several months is required for immunization to be complete. About 10 per cent of the children injected with a total of 8 c.c. of the approved commercial vaccine contracted pertussis when subsequently exposed to infection. Some of the factors which might interfere with the immunity response are controllable.

REFERENCES

1. Miller, J. Experimental Observations on the Antigenic Potency of *H. pertussis* Extracts. *J. Immunol.*, 26:247, 1934.
2. Madsen, T. Whooping Cough; Its Bacteriology, Diagnosis, Prevention and Treatment. *Boston M. & S. J.*, 192:50, 1925.
3. Madsen, T. Vaccination Against Whooping Cough. *J.A.M.A.*, 101:187, 1933.
4. McDonald, F. Whooping Cough; With Particular Reference to Prophylaxis and Treatment with Vaccines. *New England J. Med.*, 213:198, 1935.
5. Smith, R. "Summary" of the Symposium on the Control of Communicable Diseases. *New England J. Med.*, 213:211, 1935.
6. Gundel, M., Keller, W., and Schlüter, W. Serologic Diagnosis and Specific Treatment of Pertussis. *Ztschr. f. Kinderh.*, 57, 89, 1935.
7. Sauer, L. Whooping Cough; A Study in Immunization. *J.A.M.A.*, 100:239, 1933.
8. Sauer, L. Immunization with *Bacillus Pertussis* Vaccine. *J.A.M.A.*, 101:1449-1451, 1933.
9. Macdonald, H., and Macdonald, E. Experimental Pertussis. *J. Infect. Dis.*, 53:328, 1933.
10. Bordet, J., and Genou, O. L'Endotoxine Coqueluche. *Ann. d'l Inst. Pasteur*, 23:415, 1909.
11. Mishulow, L., Mowry, I., and Scott, E. Pertussis Toxic Filtrates and Toxin-vaccines. *J. Immunol.*, 19:227, 1930.
12. Krueger, A. Method for Preparation of Bacterial Antigens. *J. Infect. Dis.*, 53:237, 1933.
13. Truschina, E., Pechletzkaja, W., and Murawjewa, O. Das Toxin der Keuchhustenmikrobe. *Ztschr. f. Immunitätsforsch.*, 83:124, 1934.
14. Leslie, P., and Gardner, A. The Phases of Hemophilus Pertussis. *J. Hyg.*, 31:423, 1931.
15. Kendrick, P., and Eldering, G. Significance of Bacteriological Methods in Diagnosis and Control of Whooping Cough. *A.J.P.H.*, 25:147, 1935.
16. Mishulow, L., Oldenbusch, C., and Scholl, M. Potency of Stored Pertussis Vaccines. *J. Infect. Dis.*, 41:169, 1927.
17. Fishbein, M. *Handbook of Therapy*, American Medical Association, Ed. 10, 1935, p. 60.

Observations Upon the Methods of Transmission of Amebiasis*

CHARLES F. CRAIG, M.D., F.A.P.H.A., COLONEL
U. S. ARMY, RETIRED. D. S. M.

*Director, Department of Tropical Medicine and Professor of Tropical Medicine,
Medical School, Tulane University, New Orleans, La.*

SINCE the widespread outbreak of amebic dysentery, originating in certain hotels of Chicago in 1934, the subject of amebiasis has attracted much attention in the United States and, because of the particular method of transmission in this epidemic, the impression has gained ground in certain quarters that we must revise our theories and our interpretation of facts regarding the transmission of this parasite, due to new and important data which were observed both epidemiologically and clinically during this outbreak.

As a matter of fact, in the opinion of the writer, no new essential epidemiological or clinical data have been secured as a result of the study of the Chicago epidemic, beyond the demonstration that cross-connections between water used for domestic purposes and polluted water supplies or sewers may act as very important sources of infection. While the Chicago epidemic was spectacular in its severity and the number of cases of amebic dysentery that resulted, the fact that water may be a transmitting agent is neither new nor has it been underestimated by students of amebiasis in

the past. However, some authorities, because of the epidemic mentioned, have recently endeavored to prove that water is the usual transmitting agent of this parasite and that other methods of transmission, especially that by food handlers, are negligible.

Water polluted with material containing *Endameba histolytica* has been recognized as an important method of transmission of amebiasis ever since the discovery of the etiological relationship of this parasite to amebic dysentery. Almost every writer and investigator has called attention to polluted water as a common method of transmission where the disposal of fecal material was not under sanitary control, so that the mere fact that water may transmit this infection was well known even before the discovery of the relationship of the cysts of *E. histolytica* to transmission. After the discovery of the cysts it was demonstrated by several investigators that these may live in water for a period varying from days to weeks, depending upon the amount of fecal pollution and conditions of temperature.

The writer has repeatedly urged the importance of a polluted water supply in the production of localized epidemics of amebic dysentery and has called attention to our experience in the

* Presented to the Pan American Medical Association, Sixth Annual Cruise, July, 1935.

Philippines during the Philippine Insurrection, as an example. During the time that our troops were engaged in active operations in the field amebic dysentery was very prevalent, occurring in veritable epidemics, and it was the consensus of all who studied these outbreaks that they were due to the drinking of polluted water from wells, springs, water courses, and local tanks, for when the troops returned to their permanent camps where there was a carefully guarded water supply and sanitary precautions regarding food handling were enforced, amebic dysentery soon ceased to be a factor of importance in the health records. That these local epidemics were not due to bacillary dysentery was conclusively demonstrated by laboratory observations, for bacillary dysentery was also prevalent among the troops in certain regions, and the distinction between the two forms was insisted upon by the authorities and made in the army laboratories.

Many years ago the writer and others called attention to the fact that under certain conditions, as the pollution of a water supply used by a large number of individuals, epidemics of amebic dysentery may occur, and while the possibility of such occurrence has been denied by certain protozoölogists upon the basis of purely biological inductions, the fact remains that such epidemics have occurred and will continue to do so when conditions favoring them are present. The Chicago epidemic of 1934 and the still later outbreaks in that city caused by drinking polluted water, described by Bundesen (1935), are merely the most recent examples of the epidemic occurrence of amebic dysentery when conditions are favorable.

The writer has no desire to minimize the importance of water as a transmitting agent of amebiasis, but in this

contribution it is desired to protest against a growing tendency to over-emphasize the importance of water and to minimize what should be regarded as a much more constant method of transmission, *i.e.*, the food handler who is excreting cysts of *E. histolytica* and who is careless in the observance of personal hygiene.

It is generally conceded that the most important methods of transmission of amebiasis are through a polluted water supply; by means of infected food handlers; through vegetables contaminated by polluted water or sewage; and by the droppings of flies or other insects that have fed upon material containing the cysts of this organism. Of these methods it is certain that the most important are transmission by polluted water and by infected food handlers and it is the relative importance of these two methods that will now be discussed.

There can be no doubt that where cross-connections exist between a domestic water supply and one unfit for domestic use because of sewage pollution, or cross-connections between a domestic supply and a sewer, there is always present a potential danger of infection with *E. histolytica* and that mass infection, severe in type, may occur in this manner. It is also true, that despite laws to the contrary such cross-connections exist in the older hotels and public buildings throughout the United States; but the fact that epidemics of amebic dysentery similar to the Chicago epidemic were unheard of before, is certainly proof that such cross-connections have not in the past been of very great importance in the transmission of amebiasis. To claim that this method of transmission is the most important one is not warranted by the evidence, for with the exception of that furnished by the Chicago epidemic, there is none which would indi-

cate that in a well sanitized city with a filtered water supply such a method of transmission is at all common or of great importance.

Under certain unusual conditions where raw polluted water is admitted to domestic supplies or where a large number of people drink a polluted water, as in the instances cited by Bundesen (1935), water may become a very important transmitting agent of amebiasis, but under usual conditions an unprejudiced student of the subject must admit that in cities and towns having a filtered water supply this method of transmission is not of prime importance.

It is in rural rather than in urban localities that water is probably a very common method of transmission. In such regions water for domestic use is usually obtained from wells or springs, and soil pollution with fecal material is of frequent occurrence. It is obvious that if such material containing cysts of *E. histolytica* is washed into the water supply it will result in the transmission of amebiasis by the water so contaminated, and no one can doubt that under such conditions this method of transmission is most important. However, even under these conditions one frequently finds that the person who prepares the food for the family is a carrier of the parasite, so that it is often impossible to evaluate the relative importance of transmission by water or through the handling of food by the infected individual.

Until quite recently all students of amebiasis have been convinced that the usual method of transmission of *E. histolytica* from man to man is by the infected food handler. The Chicago experience has led some authorities to doubt that this method of transmission is of frequent occurrence and some experimental work has been published which the authors believe demonstrates that transmission by food handlers is

the exception rather than the rule. Spector and Buky (1934) found that cysts of *E. histolytica* perished within 10 minutes when dried upon volunteers' hands grossly soiled with feces containing them, and these investigators conclude that the results of their experiments demonstrate that transmission by food handlers is not a very important source of infection. However, it should be remembered that even as short a period as 10 minutes is amply sufficient for a food handler to contaminate food if it is handled directly after the carrier leaves the toilet as very frequently happens, and Andrews (1934) has demonstrated that the cysts of this ameba may remain under the finger nails of unwashed hands in a viable condition for periods varying from 5 to 45 minutes and concludes that

The short survival period of *E. histolytica* cysts on the surface of fingers is no serious impediment to the acceptance of the proposition that food handlers may play a rôle of considerable importance in the dissemination of amebiasis.

This very conservative conclusion of Andrews is justified and, in the opinion of the writer, more than justified by epidemiologic and experimental evidence, for anyone who has had an extended experience with the epidemiology of amebiasis knows that transmission by food handlers is the usual method of transmission where there is a properly constructed public water supply.

Another contribution that has been used as an argument against the importance of food handlers in the transmission of this infection is that by Spector, Foster, and Glover (1935). These observers examined the hands of 74 carriers of *E. histolytica* immediately after passing their feces in the usual manner and found that 5, or 6.8 per cent, were positive for the cysts of this parasite. The hands were not washed

before the examinations were made. They conclude that the small percentage of the carriers whose hands were found positive for the cysts after defecation shows that contamination of food by food handlers who are carriers of this ameba must occur infrequently.

In the opinion of the writer the results of the observations of Spector, Foster, and Glover demonstrate the exact opposite of their conclusions. When it is remembered that in these 74 carriers only one examination after defecation was made and yet 6.8 per cent showed the cysts of *E. histolytica* upon their fingers, one is justified in believing that had from 4 to 6 such examinations been made, after as many defecations, a considerably larger number would have shown the presence of cysts upon their hands, so that their conclusion is not justified because of the small number of examinations that were made.

Furthermore, the fact that as many as 5, or 6.8 per cent, did show contamination of the hands by the cysts is sufficient proof of the importance of the infected food handler in the transmission of the disease. Certainly if in a survey of that number of infected food handlers 6.8 per cent of them, after a single defecation, showed contamination of their hands with cysts, it should be considered conclusive proof of the danger of the transmission of amebiasis by this class of individuals. It is obvious that the conclusion of these investigators that contamination of food by infected food handlers occurs infrequently is not justified, but that their results speak eloquently in favor of the importance of the food handler in the transmission of amebiasis.

The distribution of amebiasis among urban populations, as shown in numerous surveys made by competent observers, demonstrates that contamination of food by food handlers is the chief method of transmission of this

infection in such communities, and it has invariably been found that the incidence of infection in such populations is much higher among the ignorant and poor than among the more intelligent classes of the community. That this higher incidence cannot be due to transmission by water has been shown by the fact that the domestic water supply is the same for all classes and cross-connections in plumbing or other sources of water pollution, aside from contamination through food handlers, have not been demonstrated. In fact, the more prosperous classes in any urban community are much more apt to be exposed to infection from water pollution because of the greater frequency with which they eat in restaurants and hotels, where cross-connections in plumbing or back siphonage from a polluted into a safe water supply are much more apt to be present.

The higher incidence of infection with *E. histolytica* among the poor and less intelligent population of a city is believed by the writer to be almost entirely due to the contamination of the food prepared by someone in the household who is a carrier of this parasite. This is shown by numerous instances of familial infection in which a careful study has demonstrated beyond question the source of the infection.

Indeed, in these familial infections with *E. histolytica* we possess the indisputable proof of the importance of the food handler in the transmission of amebiasis, and such familial infections, although much more numerous among the lower classes of our urban populations, are by no means confined to such classes, for the writer has records of many families among the well-to-do and educated in which several members were infected from cooks who were carriers of *E. histolytica*, and where any possible source of water transmission except that furnished by

the food handler could be absolutely eliminated.

As an illustration of this type of familial infection the following may be cited:

The family of a high-ranking officer of the United States Army, consisting of 8 members, and residing in an army post just outside Washington, D. C., was examined by the writer for infection with *E. histolytica* owing to the fact that the officer had consulted him regarding attacks of slight diarrhea which had occurred at irregular intervals for about a year. Examination in his case disclosed an infection with this parasite and examinations of the remaining 7 members of his family resulted in showing that 4 others had a latent infection with this ameba, i.e., 62.5 per cent of the family showed infection. The cook in this family was a Filipino boy who had worked for them for over a year and an examination showed that he was a carrier of *E. histolytica*. The water used for all purposes was from an impounded and filtered supply furnished the entire post, and the plumbing in the dwelling occupied by the family was in perfect condition with no possibility of pollution by cross-connections or back siphonage. No other cases of amebic diarrhea or dysentery were reported in the post during the time that these examinations were made. The treatment of the infected members of the family and the cook resulted in the disappearance of the infection, and no further infections occurred in this family, although they were all examined at regular intervals over a period of 1 year.

Another instance, personally observed by the writer, in which water directly contaminated by a carrier was the source of infection may be cited:

In an office where 5 individuals were employed there developed in 1 an acute attack of amebic dysentery, and an examination of the other employees demonstrated infection with *E. histolytica* in 2 others, proving that 3, or 60 per cent, of the personnel were infected with this parasite. A study of the local situation resulted in demonstrating that 1 of the infected individuals cared for the water cooler, cleaning it each morning and handling the ice with which it was supplied. The 2 others who were infected were in the habit of drinking large quantities of water from this cooler each day, while the 2 members of the office personnel who escaped

infection never drank water from the cooler but from the faucet of the general water supply of the building in which the office was located. Several hundred people were employed in this building and there was no case of amebic diarrhea or dysentery reported during the time that these infections occurred.

These clear-cut examples of contamination of food and water by handling should alone be sufficient to demonstrate the great danger of the transmission of amebiasis by infected food handlers, but such examples in the experience of the writer can be multiplied many times. As he has stated elsewhere (1935)—

The contamination of food and drink by food handlers, who are passing the cysts of *E. histolytica*, the so-called "carriers," is undoubtedly the most common and most important method of transmission in many localities and certainly so in towns and cities having an impounded water supply and where sanitation is otherwise excellent. Food handlers in our hotels, restaurants, lunch counters, roadside refreshment stands, and other places where food is handled and sold, are the chief sources of amebic infection in well sanitized towns and cities in the United States, and it may be stated that the contamination of food and drink handled by infected food handlers is practically a certainty unless the greatest care is taken regarding personal hygiene and the cleanliness of the hands of those who handle the food. One has only to watch the average salad maker in the average hotel or restaurant to understand how uncooked food may become infected, for each separate leaf of lettuce and each slice of tomato or other vegetable or fruit is actually handled in arranging the salad and making it appear attractive. Cooks and mess attendants, salad makers, bread boys, and even waiters, are often very efficient transmitters of amebiasis.

In conclusion, it may be stated that the evidence available demonstrates that water as a method of transmission of amebiasis ranks second in importance to contamination of food by food handlers who are carriers of *E. histolytica*; that both methods of transmission should be most carefully

guarded against and controlled, if possible; but that efforts to minimize the danger of transmission by food handlers are to be deplored and will result in increasing the already high incidence of an important disease producing parasite of man.

REFERENCES

- Andrews, J. *Am. J. Trop. Med.*, 14:439, 1934.
 Bundesen, H. N. *Am. J. Trop. Med.*, 15:455, 1935.
 Craig, C. F. *Amebiasis and Amebic Dysentery*, 1934.
 Spector, B. K., and Buky. *Pub. Health Rep.*, 49:379, 1934.
 Spector, B. K., Foster, and Glover. *Pub. Health Rep.*, 50:163, 1935.

Safe Toys

. . . In the last year alone 15,400 children under 15 years of age died as the result of accidents, and 13,500 more young men and women 15 to 24 years of age were killed by accidents—a total of 29,000. And that, more or less, is what happens year after year. . . .

The country has told us over and over again that in 30 years we have killed and injured more people by using fireworks to celebrate the acquisition of our independence than were killed in acquiring that independence in the Revolutionary War. . . .

A study is being made by the American Museum of Safety, with the coöperation of the National Society for the Prevention of Blindness and other public health agencies. The study was financed by the fireworks manufacturers, themselves, who are at last beginning to realize the gravity of the situation. . . . There are in hand reports of more than a score of persons who were killed and more than 6,000 who were injured as a result of the celebration of the past Fourth of July with fireworks, firearms and bonfires.

You may ask, why bring these unpleasant facts to an audience of school teachers? The answer is that school teachers probably have a greater opportunity than any other group to

influence safe conduct among school children. . . .

School teachers have not only a responsibility for the prevention of accidents on school property, but have an extraordinary opportunity to help children acquire safe habits without at the same time losing the zest for life and adventure. . . .

The records of the National Society for the Prevention of Blindness tell the story of scores of children who lose the sight of one or both eyes each year as the result of shots from air rifles, gifts from fond parents. . . .

We are getting the coöperation not only of the fireworks manufacturers, but of toy manufacturers, in our efforts to make playthings less hazardous, but the time is still far off when we may assume that a toy is safe for a child because its manufacturer or the merchant who sells it says it is. . . .

How to bring safety education to the parents and guardians of these children is the task of all of us—the National Safety Council, the National Society for the Prevention of Blindness, the many other public health agencies in the country, and the public schools as well. . . .—From address by Lewis H. Carris at a meeting of the Child Education Section of the National Safety Congress, Louisville, Ky., Oct. 14, 1935.

Need for Health Instruction in Cleanliness

HUGH GRANT ROWELL, M.D., AND JAMES A. TOBEY,
DR.P.H., F.A.P.H.A. (*Life Member*)

*Professor of Health Education, Teachers College, Columbia University, New York,
N. Y.; President, Westchester Tuberculosis and Public Health
Association, Inc., White Plains, N. Y.*

IT is no exaggeration to state that, broadly interpreted, modern civilization depends for its existence upon cleanliness. Progressive communities have recognized this fact and have provided their citizens with pure water supplies and safe methods of sewage and waste disposal. As a consequence of these ventures in municipal housecleaning, the former high incidence of certain water-borne and filth-borne diseases has been greatly reduced. Typhoid fever, for example, caused nearly 36 deaths per 100,000 population in the United States in 1900, whereas in 1928 it was responsible for less than 5 deaths per 100,000, and in 1934 23 of our largest cities had no deaths at all from this once ubiquitous scourge.

Diseases due to lack of cleanliness have been reduced, but by no means eradicated. This is because environmental sanitation, no matter how highly developed, is only one of the many factors in health protection. Personal hygiene, as applied to all life situations, is as important in disease prevention as is public sanitation, but for one reason or another individual hygiene in this country seems to be much less advanced than is community hygiene.

responsibility that lies in the laps of our educational authorities. The school takes the child in his impressionable years, gives him knowledge, and teaches him the alphabet of life. It endeavors to inculcate in him proper habits of living, including the way to health through good nutrition and general hygiene. Sometimes, but not always, it furnishes him with an environment that is conducive to good health.

When the school performs these functions adequately and satisfactorily, its influence extends far beyond its own confines, for the school child carries the message of good health into the home. The pupil who has learned that a quart of pure milk a day will give him healthful growth, that this milk ought to be pasteurized, that he must wash his hands before each meal and after leaving the toilet, and that soap has a definitely useful purpose, will contribute these and other necessary hygienic precepts to the entire family, the members of which will be benefitted thereby.

In its health instruction, the school operates best by action rather than by words. Thus, lectures and discourses are much less valuable and effective in teaching good health practices than are actual performances by the children

THE RÔLE OF THE SCHOOL

The correction of this situation is a

themselves and by their teachers. A student may learn and recite glibly that moving air at a temperature of 68° F. is most desirable for health, and yet, as frequently happens, the temperature of his own classroom may be maintained routinely at the enervating figure of 74° F.

Similarly, the child may be instructed to wash his hands with soap and water after using the toilet and before lunch, but the school may have neglected to provide soap and towels, and even water, or at least hot water, for this laudable purpose. He may be told that cleanliness is next to godliness, but may have inadequate facilities for bathing at home and none at school, even after participating in athletics and other desirable physical exercise. Physical education is part of the curriculum in most modern schools, but many of them fail to furnish shower baths to remove the perspiration and grime that usually accumulate when children indulge in organized exercise and play.

FACILITIES FOR CLEANLINESS IN SCHOOLS

Extensive surveys of handwashing equipment in schools have revealed that in the majority of our educational institutions the necessary combinations of hot water, soap, and individual towels, conveniently located and in sufficient quantities, are seldom available. Thus, in 1928 it was found from an investigation of 404 schools located in 22 states and the Dominion of Canada, that in only 53.2 per cent of the buildings was hot water supplied, in 80 per cent was some form of soap furnished, and in 84.1 per cent were towels available.

When, moreover, complete and adequate hand-washing facilities were considered, only 32 per cent of these schools could comply with the American Child Health Association's reason-

able standards of one lavatory to every 80 pupils, equipped with all three of the necessities for proper ablutions. Only 19.3 per cent of these same schools conformed to the more stringent school health requirements of the Massachusetts Institute of Technology, specifying at least one well equipped lavatory for every 40 pupils, while only 5.7 per cent of them were within the Wood-Rowell standards of at least one lavatory, with hot water, soap, and towels conveniently located, to every 20 pupils.¹

Another investigation conducted a few years later in 145 schools in 15 states showed that about 99 per cent furnished water, but only about 74 per cent provided hot water; that only 57 per cent supplied soap for general hand-washing; that only about 70 per cent had drying equipment; and, finally, that a mere 31 per cent had all three of these necessary facilities together.²

Not only was there a distressing lack of cleanliness equipment in two-thirds of these schools, but in most cases the supplies provided were insufficient for the best results, or were not available throughout the year. The average expenditure for soap per child was estimated to be only about half what it should have been in order to permit each pupil to wash his hands twice a day, a reasonable minimum and far less than any average adult would find acceptable.

The quality of the soap employed in these schools, whether cake, powdered, liquid, or flake, frequently was not well adapted for its purpose or the device was out of order, or out of soap. The efficiency of soap is influenced by the chemical nature of the water available, and also by the purity and composition of the soap itself. A poor grade of soap which has low solubility in a particular water supply, greatly increases the time element required for handwashing and reduces

the efficiency of the process. Poor soaps may also cause irritation of the skin. For these reasons, soap obtained for personal cleanliness in schools should be pure, in the commercial sense, and carefully selected with regard to local conditions. The school janitor is not always an expert with respect to the chemical nature of water and the choice of soap needed to cope with the local supply. The selection of proper soaps has not been brought adequately to the attention of school authorities. Price is only one factor, since cheap soaps, or wrongly selected ones are often the most costly. The traveller in Europe becomes most emphatic on this point following experience with native soaps there.

PURITY STANDARDS OF SOAP

Since the purpose of hand-washing is hygienic as well as esthetic, and since the process, by removing dangerous microorganisms along with dirt, should be a real factor in preventing the spread of communicable diseases, the purity standards of the soaps used in school lavatories are of considerable significance. School administrators should, therefore, have a clear understanding of the germicidal powers of various soaps.

When the human body is involved, the criteria of effectiveness of cleansing agents must be their success in removing dirt, odors, and bacteria; their efficiency in destroying or nullifying the toxic effects of these microorganisms; and, finally, the condition of the human body, chiefly the skin, when the cleansing process has been brought to a successful conclusion.

Chemically, soaps are combinations of strong alkalis, such as sodium and potassium, with weak acids, mainly the fatty acids. They are alkaline products of varying alkalinity, the sodium soaps being generally known as "hard," and the potassium soaps as "soft." A

"pure" soap in the commercial sense is one made from high quality fat and possessed of a relatively small amount of free alkali which is an irritant to tender skins and may also cause trouble when the average skin is exposed to it over a long period.

The germicidal properties of soaps have been scientifically studied by a number of competent investigators. It has been demonstrated that pure soaps are highly germicidal against such dangerous organisms as streptococci, pneumococci, meningococci, influenza bacilli, and *Spirocheta pallida*.³ In other words, ablution with pure soaps aids in reducing the hazards of possible transmission of various respiratory diseases, and of syphilis, if the germs causing these maladies happen to be present on the hands. Soap has likewise been found to be a valuable prophylactic in Vincent's angina.⁴

The use of hot water with soap adds to its germicidal efficacy, part of the effect being due to the heat. Of course, however, the bactericidal action of soap is selective, since the use of pure soap is of little value against such highly resistant organisms as the typhoid bacillus and the staphylococcus, although certain types of specially prepared laboratory soaps will destroy even these bacteria. In this connection it is well to remember that a medicinal odor adds nothing to the cleansing or germicidal value of soap.

In a recently published review of the germicidal value of pure soap, a well known dermatologist reaches the conclusion: "Soaps are potent factors in preventing the spread of disease not only on account of their germicidal action on the common organisms . . . but also because no antiseptic can replace cleanliness."⁵ This authority also points out that soap is the most practical disinfectant for everyday life, to be supplemented when the occasion arises by surgical antiseptics prescribed

by physicians, and he also states that pure soap is superior to other types of soap in its germicidal powers.

THE DUTY OF EDUCATIONAL AUTHORITIES

From these facts it is obvious that hand-washing in schools, in industry, and in the home is a prophylactic measure of real hygienic significance. It is the important duty of all school physicians and nurses to recommend most strongly that adequate sanitary facilities and equipment for this purpose be installed where they are lacking, and it is the duty of educational authorities to provide ample means for the carrying out of this salutary practice. If they fail to do so, the parent, as the voter and tax payer, should be heard from. The function of the teacher, as the individual who is primarily responsible for health education in the classroom, is to insist that hand-washing with hot water and pure soap be a routine procedure by all pupils, especially after leaving the toilet and before eating.

The more extensive application of these and other hygienic principles among the 26 million school children of this country will result in a gratifying decline in the incidence of certain types of disease, commonest causes of absenteeism, and by its favorable effect upon school health and upon public health generally, will help to promote a more vigorous and salubrious American citizenry. In these days, when homes must frequently put up with deprivations and economies of relief or wrecked budgets, the school must be able to offer a proper balance in cleanliness, as in other health practices, for the ideals and ideas of growing Americans.

REFERENCES

1. Hand-washing Facilities in Schools. School Health Bureau. Metropolitan Life Insurance Company. *Monograph No. 3*, 1928.
2. Handwashing in Schools. *School Service*, Cleanliness Institute, 1931.
3. Walker, J. E. Germicidal and Therapeutic Applications of Soap. *J.A.M.A.*, 97:19 (July 4), 1931.
4. Reasoner, M. A., and Gill, W. D. The Use of Soap in the Prophylaxis of Vincent's Infections. *J.A.M.A.*, 88:716, 1927.
5. Diasio, F. A. Germicidal Value of Pure Soap. *Med. Rev. Revs.*, Aug., 1934.

A Study of *B. coli mutabile* from an Outbreak of Diarrhea in the New-born*

ANNA DEAN DULANEY, PH.D., AND I. D. MICHELSON, M.D.

Medical School, University of Tennessee, Memphis, Tenn.

DURING the winter of 1933-1934 a succession of cases of a hitherto unrecognized diarrhea occurred among the new-born in the Memphis General Hospital. Forty-seven per cent of the infants affected died.

The disease made its appearance on the 5th to the 9th day of life, and there was no relation to sex, race, prenatal history, or state of nutrition. Since the outbreak occurred during the height of the economic depression, the lack of correlation with the nutritional state is worthy of notice.

The onset of illness was characterized by an elevation of temperature or marked loss of weight occurring within 24 hours. This was followed by a diarrhea which increased in intensity until the stools numbered 10 to 20 per day. The stools were watery, yellowish or yellowish green of color and, surprisingly, free from blood, pus, or mucus.

Vomiting usually followed the feedings, the vomitus consisting of curds of yellowish, partially digested food. Dehydration, septicemia, otitis media, and alkalosis were complicating factors. In cases ending fatally, the infants became cyanotic, respiration was rapid

and shallow, and the eyes were sunken.

The physical findings were essentially negative. No medication seemed effective, and in 4 to 9 days the babies either died or gradually improved.

At necropsy the positive findings were dehydration, acute cloudy swelling of the visceral organs, otitis media, and, in several cases, bronchopneumonia. The intestinal tract was negative on gross and microscopic examination.

Extensive bacteriological studies were carried out in the hope of determining the causative agent. Cultures were made from feces, urine, blood; and nose, throat, and ear discharges of the sick babies. Five autopsies were performed and blood, exudates, and swabs from the visceral organs were inoculated to suitable media. The feedings were repeatedly cultured, as were swabs from the nipples of the bottles in order to detect food or hand contaminations. The throat and fecal flora of the mothers and attending nurses were studied. With the possible exception of the fecal cultures the findings were varied and inconsistent, and permitted no conclusions as to a specific causative agent.

Blood cultures from 10 of the babies yielded *B. coli*, *Staphylococcus albus*,

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

and pneumococci, with *B. coli* as the organism of highest incidence. The possibilities of terminal invasion and skin contamination were recognized. *B. coli* and *Staphylococcus albus* were obtained from the urine cultures; *B. coli*, streptococci, staphylococci, pneumococci from nose and throat swabbings; and staphylococci, *B. coli* and pneumococci from cultures from the ear. *B. coli* was the most common organism found in middle ear infections. The most significant bacteriologic findings at autopsy were the frequent isolations of *B. coli*, and these results will be discussed later.

Repeated culturing of the yellowish watery stools consistently yielded slow lactose fermenting bacilli which proved to be *B. coli mutabile* in a high percentage of cases, and the study of these cultures instigated this report.

METHOD OF EXAMINATION OF FECES AND FINDINGS

The specimens of feces from all babies were obtained by introducing a sterile proctoscope and swabbing the rectum. The swabs were immediately washed off in tubes containing 2 c.c. of sterile physiological saline. Smears were stained by Gram's method. As a rule, the smears showed a mixture of organisms—*B. bifidus*, enterococci, Gram-negative bacilli, etc. The stools of normal breast fed babies contained *B. bifidus* as the predominating organism, over 90 per cent of the organisms were of this type, while the stools of healthy babies artificially fed showed a high proportion of Gram-negative bacilli. Regardless of the type of feeding, the stools of babies suffering from diarrhea gave a high percentage of Gram-negative bacilli, with Gram-positive organisms present in small numbers. The Gram-negative bacilli in the diarrheal stools were single or paired, with rounded ends.

Serial dilutions of the initial fecal

suspensions were made so that the last tube was water clear. The three highest dilutions were spread on dry Endo's plates, by bent glass rods. Fecal suspensions from sick babies were also inoculated on blood, and plain agar plates, brain medium, and nutrient broth. All cultures were made in duplicate and grown under aerobic and anaerobic conditions.

The Endo's plates showed the most interesting and significant results. Three chief types of colonies were observed—typical *B. coli* colonies, flat and metallic; small pin-point colonies which proved to be enterococci; and colorless colonies characteristic of the typhoid-dysentery group. The colorless colonies, which when present outnumbered the other types on all Endo's plates, were opalescent, regular in outline, raised, typically smooth, and measured 1 to 2 mm. in diameter. When transplanted to Russell's double sugar a paratyphoid reaction was obtained with active production of acid and gas in the butt and no change in the slant. After 2-3 days at room temperature, secondary colonies appeared on the slant; these were raised, yellowish, circumscribed elevations in the midst of the mass growth. When dilute suspensions of 24 hour cultures on Russell's double sugar were spread on Endo's plates, only colorless non-lactose fermenting colonies were obtained. Within 48 to 72 hours a number of these originally colorless colonies developed red metallic papillæ. We then recognized the organism as *B. coli mutabile* and were able to demonstrate the cycle of colony form described by Neisser (1906)¹ and Massini (1907).²

Transplants were made to Russell's double sugar and plain agar, and stored while we made the examinations of feces of healthy and diseased adults. Specimens of stools were collected on sterile swabs, a saline suspension was

made, and spread on Endo's plates. These plates were observed for non-lactose fermenting colonies and subcultures were made.

INCIDENCE

The stools of 27 sick babies were cultured and in 18 (67 per cent) *B. coli mutabile* organisms were present in large numbers. As shown in Table I, we also cultured the stools of 41

ganism. Of 43 parturition patients 9 (21 per cent) showed slow lactose fermenting bacilli, 3 (5 per cent) of which were *B. coli mutabile*.

It is seen that slow lactose fermenting Gram-negative bacilli are increased in pathologic conditions in which diarrhea is a part of the picture, an observation frequently reported. While 32 per cent of sick adults showed such organisms in their stools, the inci-

TABLE I

SHOWING THE INCIDENCE OF *B. COLI MUTABILE* IN THE STOOLS OF 186 DISEASED AND NORMAL BABIES AND ADULTS

Group	Number	Slow Lactose Fermenting Gram-negative Bacilli	<i>B. coli mutabile</i> Present	Negative for Both
Sick babies	27	18 (67%)	18 (67%)	9 (33%)
Normal babies	41	5 (12%)	5 (12%)	36 (88%)
Normal adults	47	5 (10%)	1 (2%)	42 (90%)
Sick adults	28	9 (32%)	2 (7%)	19 (68%)
Parturition	43	9 (21%)	3 (7%)	34 (79%)

normal babies and of 118 healthy and diseased adults to ascertain the frequency of this organism and other slow lactose fermenters in normal and pathological conditions of the gastrointestinal tract. Of 21 normal babies, studied at the time of the epidemic, we isolated *B. coli mutabile* from the stools of 5 (24 per cent). Six months later, when the outbreak of diarrhea had entirely subsided, we examined the stools of 20 other normal babies and did not find this organism in any specimen. Five (10 per cent) of the stools from 47 normal individuals were positive for slow lactose fermenting Gram-negative bacilli, and 1 (2 per cent) proved to be *B. coli mutabile*. Examination of the stools of 28 adults suffering from diseases in which diarrhea may be an outstanding symptom (typhoid fever, dysentery, food poisoning) yielded 9 strains of slow lactose fermenting Gram-negative bacilli, 2 (7 per cent) of which fulfilled the cyclic criteria of this "mutabile" or-

dence of slow lactose fermenting Gram-negative bacilli in the stools of babies suffering with diarrhea increased to more than twice this figure. All of these organisms proved to be *B. coli mutabile*. Kriebel³ has reviewed the literature on this question and described such organisms which she isolated from food handlers and persons suffering from diarrhea and vomiting of unknown origin. We made no attempt to classify these miscellaneous slow lactose fermenting bacilli and only studied the organisms which were typical *B. coli mutabile*. The incidence of these unidentified slow lactose fermenting Gram-negative bacilli was increased in the parturition group.

Autopsy cultures yielded a variety of organisms. *B. coli mutabile* was found in 3 of the 5 cases; in 2 this organism was recovered from the heart blood, spleen, ileum, jejunum, colon, and middle ears. In each case in which a pure culture of *B. coli muta-*

bile was obtained from one ear, cultures from the other ear showed a mixed flora.

While we are reluctant to assign a fixed etiological rôle to this organism, the high percentage of isolations from the stools of infants showing diarrhea, the low incidence in stools of normal babies and normal and sick adults is regarded as highly significant. Additional evidence is offered by the absence of gross and microscopic changes in the intestinal tract and the isolation of this organism from secondary foci of infection at autopsy. Finally, the cultural and serological relationship found to exist among these organisms affords the best bacteriologic evidence of their possible etiological rôle.

OBSERVATIONS ON *B. COLI* MUTABILE IN RELATION TO LACTOSE

Suspensions from the edge of the colorless mother colony when spread on Endo's plates gave rise to 100 per cent colorless colonies. Within 3 days, approximately one-fourth of these colonies had developed red metallic papillæ, and after 10 days all showed this phenomenon. In most cases, the earliest papillæ appeared near the center of the colony. Papillæ usually developed 1 to 2 days earlier at incubator than at room temperature, but the final number was not different.

When a saline suspension of these metallic papillæ was spread on Endo's agar, both red and white colonies developed. The red typical *B. coli* type predominated; as a rule, less than a third of the colonies were colorless. The white colony showed the S characteristics; the red colony was flat and granular and suggestive of the R type. The lactose fermenting colon-like colony bred true while the colorless non-lactose fermenting colony reproduced the mutabile cycle.

It was thus possible to obtain a

red strain which was stable and a white strain which was unstable in that it continued to give rise to some red descendants. We have designated the lactose fermenting organisms as "red" and the non-lactose fermenting organisms as "white," unless otherwise indicated. All efforts to obtain a stable white strain have failed. We tried repeated platings of both young and old colonies—reasoning that very young colonies might be expected to yield only white descendants before red variants had been given off in response to the lactose stimulation, and that variation in old colonies would not occur after active cell division had ceased, but all white colonies, young or old, have continued to yield red papillæ on Endo's plates and apparently all non-lactose fermenting cells are able to give rise to lactose fermenting descendants under the stimulus provided by the lactose. We also tried plating after storage on plain agar, but so far have obtained no stable non-lactose fermenting cultures.

Transplanting of the white strain to Russell's double sugar medium at intervals of 1 or 2 days maintained the paratyphoid-like reaction. If transplantation were delayed for 10 to 14 days, until numerous secondary colonies had developed, a typical colon reaction was produced on the Russell's agar.

Serial passage of the white strain in lactose broth speeded up the rate of lactose utilization. Four to 7 days were initially required for production of acid and gas in 1 per cent lactose broth, but after 7 to 10 passages at 24 hour intervals, it occurred in 48 hours. This is in accordance with the findings of Jones,⁴ Kennedy,⁵ Kriebel,³ and others on atypical colon bacilli.

The utilization of lactose was also influenced by the type of culture container. Kennedy⁵ states that his slow lactose fermenting organisms broke down lactose more rapidly when grown

in toxin flasks, and we found this to be true. For example, 1 per cent lactose broth of pH 7.4 with bromthymol-blue as an indicator was distributed in 40 c.c. amounts in the following types of containers: 1,000, 250, 125, and 50 c.c. flasks, and a large test tube 200 x 25 mm. A regulation test tube, 120 x 18 mm., containing 20 c.c. of broth served as a control.

All containers received the same inoculum of white organisms prepared by scraping off a single non-lactose fermenting colony from an Endo's plate inoculated 15 hours previously, and suspending the growth in sterile saline. Whereas the indicator showed an acid reaction greater than pH 6.1 in the 3 larger containers by the end of 48 hours, the 50 c.c. flask and the 2 tubes were still neutral. After 72 hours the organisms growing in the 50 c.c. flask had produced sufficient acid to change the color of the broth to yellow while the 2 tubes remained unchanged until 96 hours had elapsed.

When samples from the various sized containers were withdrawn at intervals and spread on Endo's plates the findings varied. The original inoculum and 24 hour samples from all containers yielded only non-lactose fermenting colonies and produced a typical paratyphoid reaction on Russell's double sugar. After 72 hours, samples from the tubes still gave only non-lactose fermenting colonies while Endo's plates inoculated from all 3 flasks showed both red and white colonies. A typical colon reaction was produced on Russell's double sugar. Thus the utilization of lactose was shown to be a result of dissociation; of the production of a sufficient number of red variants to break down lactose, rather than an acquired or latent use of this sugar by the white organisms. It is doubtful if the white forms can ever utilize lactose, but under the stimulus provided by this

sugar lactose splitting descendants are produced with the resultant acid and gas.

Jones *et al.*,⁴ offer data to show that apparently slow fermentation of lactose by certain strains of *B. coli* is in reality due to production of sufficient ammonia in the early hours of growth to neutralize the acid formed from the beginning. Nungester and Anderson⁶ have described a series of variants derived from a colon-like bacillus. Some of these variants produced non-lactose fermenting colonies on Andrade's indicator agar but when grown in lactose broth reversion to lactose fermenting forms took place. Kriebel³ also states that cultivation of Gram-negative non-lactose fermenting intestinal bacilli in 5 per cent lactose solution stimulated dissociation into lactose fermenting variants.

This dissociation of white to red was correlated with the utilization of lactose. Nutrient broth of pH 7.4 was prepared and 300 c.c. placed in each of 2 flasks of 500 c.c. capacity. Ten per cent lactose solution which has been separately sterilized was added to the broth to give a final concentration of 1 per cent. A single non-lactose fermenting colony from an Endo's plate which had been inoculated with the Garrett strain 15 hours previously was suspended in saline and 1 flask of broth inoculated. The other flask received a comparable inoculum of a lactose fermenting colony of the Garrett strain taken from an Endo-plate inoculated with the red form at the same time. Samples were taken immediately after inoculation; part was diluted and used for streaking of dry Endo's plates, the remainder for the quantitative determination of lactose. This procedure was repeated after 8, 19½, 25, 31, 41, 48, and 96 hours' incubation. All plates from the flask containing the culture of white organisms up to the 31 hour period:

yielded only white or non-lactose fermenting colonies. The plates inoculated with dilutions of the 31 hour sample were the first to show lactose fermenting organisms. Twelve per cent of these colonies were red metallic colon-like. The plates inoculated with dilutions of the sample taken after 41 hours' incubation gave approximately an equal number of red and white colonies while the plates from the 48 hour sample showed a 75 per cent red and 25 per cent white distribution. After 96 hours, 90 per cent of the colonies were red.

TABLE II

EFFECT OF LACTOSE ON DEVELOPMENT OF RED FORMS

<i>Hours After Inoculation</i>	<i>Percentage of Colonies on Endo's Plates</i>	
	<i>White</i>	<i>Red</i>
0	100	0
8	100	0
19½	100	0
25	100	0
31	88	12
41	50	50
48	25	75
96	10	90

The plates from the flasks inoculated with the red form consistently yielded only red lactose fermenting colonies. Details of the utilization of lactose are not included here, but while the red form actively broke down lactose from the beginning, the white form did not show definite evidence of using this sugar until 31 hours had elapsed. In other words, utilization of lactose is coincident with the appearance of red variants and lactose apparently has a stimulating effect on the production of such forms, a conclusion reached by early workers. Lewis⁷ has recently disputed this conclusion and maintains that variation occurs under any condition suitable for growth. In support of this statement he offers data obtained from plating out cultures

grown in various media. He was always able to demonstrate some variant cells, recognized on the basis of size, in colonies grown on any medium by means of densely seeded agar plates. According to him, sugars and alcohols serve as selective agents but do not specifically incite variation. We cannot agree with this since we have not been able to demonstrate the development of lactose fermenting organisms in plain broth or broth containing other sugars than lactose.

When flasks of the same size and containing equal amounts of 1 per cent lactose, 1 per cent dextrose, and plain broths received the same inoculum of white organisms and were grown under the same conditions, dissociation to the red form occurred only in the presence of lactose. Endo's plates streaked from samples of the dextrose and plain broth at intervals over a 5 day period initially gave rise to only white colonies. These in time showed lactose fermenting papillæ. With the exception of one culture in 1 per cent sucrose broth, Nungester⁶ was not able to effect reversion of his non-lactose fermenting variant to the lactose fermenting form in any medium other than lactose broth.

Daily transfer for 10 days in 1 per cent dextrose, maltose, saccharose, mannite, broths did not alter the picture when these cultures were subcultured to Endo's plates.

It was also found that the time of coming into contact with the stimulating effect of lactose did not greatly influence the end results. Equal quantities of a suspension of Garrett white organisms were introduced into 2 flasks, one containing 100 c.c. of plain broth and the other 100 c.c. of 1 per cent lactose broth. Conditions of growth were the same. After 24 hours samples from both flasks gave rise only to non-lactose fermenting colonies. After 48 hours the plating from the

lactose broth culture showed that dissociation had taken place and approximately 20 per cent of the colonies were red. The sample from the plain broth yielded only non-lactose fermenting colonies. After the 48 hour sample had been withdrawn from the plain broth culture, sufficient 10 per cent lactose was added to give a final concentration of 1 per cent and the flasks returned to the incubator. After an additional incubation period of 48 hours Endo's plates were spread with samples from the two flasks. A comparable distribution of red and white forms appeared—approximately 90 per cent of the colonies on both plates were of the red lactose fermenting variety. We had thought that late contact with the lactose might not incite variation.

CULTURAL REACTION

Nungester⁶ points out that any conclusions regarding fermentation of carbohydrates in liquid mediums by variants of a series must take into consideration the possibilities of variation occurring during the period of observation. He found that certain of his variants differed in their ability to use sugars (maltose and lactose) when grown in liquid and solid mediums containing the same concentration of these carbohydrates. Platings from the culture grown in lactose broth gave rise to a mixture of non-lactose and lactose fermenting colonies.

As previously stated, we repeatedly demonstrated that fermentation of lactose by the white forms of our *B. coli mutabile* strains was brought about by the lactose fermenting forms which developed in response to the stimulus afforded by the sugar.

We also found that apparently slow fermentations of salicin and raffinose were in reality dissociation phenomena with the production of organisms capable of utilizing these

sugars in a highly specific fashion.

Rapid fermentation of sugars was never accompanied by any dissociative process. All strains of *B. coli mutabile*—both white and red—produced acid and gas within 18 hours when grown in broths containing the following sugars in 1 per cent concentration—dextrose, maltose, mannite, saccharose, xylose, arabinose, sorbite, rhamnose, levulose. Equally active fermentation was demonstrated on sodium-sulphite-fuchsin agar (3 per cent) containing the same concentration of these sugars—only red metallic colonies forming. Apparently all organisms readily attacked these sugars.

All strains of *B. coli mutabile*—both lactose red and white—failed to break down inosite, melizitose, cellobiose and adonite after 14 days incubation.

Dulcitol, salicin, and raffinose were irregularly fermented. All strains except 1 (Shea white) fermented dulcitol within 5 days; all strains—both red and white—fermented salicin within 5 days. All 18 red forms produced acid and gas in raffinose broth in 3 to 4 days, but 8 corresponding white forms (Shea, Whitney, Lee, Russell, Byrd, Phillips, Garrett, Rimmer) failed to produce any change in this medium even after 14 to 20 days incubation.

These inconsistent results led us to study the reactions of 2 of our strains, Rimmer and Garrett, toward these sugars under conditions of liquid and solid media. Nutrient broth and sodium-sulphite-fuchsin agar (3 per cent) containing 1 per cent amounts of dulcitol, salicin, and raffinose were prepared. These media were inoculated at the same time with suspensions of Rimmer, red and white, and Garrett, red and white. The inoculums were prepared by scraping off isolated colonies from Endo's plates, inoculated the previous day, and suspending the

TABLE III

SHOWING THE REACTIONS OF GARRETT AND RIMMER (LACTOSE RED AND WHITE) IN BROTH AND ON SODIUM-SULPHITE-FUCHSIN AGAR CONTAINING THE SAME SUGARS

Strain	Dulcitol		Salicin		Raffinose	
	Broth	Agar	Broth	Agar	Broth	Agar
Garrett White	A.G.-4 da.	Colorless colonies in all cases. No metallic papillæ. Sub-cultures from broth yielded only colorless colonies.	*A.G.-3 da.	Originally colorless colonies all of which gave rise to metallic papillæ in 4 days	Neg.-20 da.	Only colorless colonies; no metallic papillæ
Garrett Red	A.G.-3 da.		*A.G.-3 da.		*A.G.-4 da.	Colorless colonies with metallic papillæ 2 days
Rimmer White	A.G.-3 da.		*A.G.-3 da.		Neg.-20 da.	Only colorless colonies; no metallic papillæ
Rimmer Red	A.G.-3 da.		*A.G.-3 da.		*A.G.-5 da.	Colorless colonies with metallic papillæ 4 days

* Sub-cultures to agar produced both white and red colonies.

growth in a small amount of saline. A summary of these results is given in Table III.

Dulcitol agar plates inoculated with these four organisms, Garrett, white and red, Rimmer, white and red, showed only colorless colonies. Even after 5 days there was no change in the general appearance nor had metallic papillæ developed. Dulcitol broth, however, was fermented by all 4 organisms in 3 to 4 days but when these cultures were spread on dulcitol agar plates only colorless non-dulcitol fermenting colonies developed. Apparently, dulcitol affords an example of true slow fermentation.

Salicin agar plates inoculated with the 4 organisms originally yielded only colorless colonies. After 4 days all colonies were studded with metallic papillæ. The salicin broth was broken

down in 3 days and when these cultures were spread on salicin sodium-sulphite-fuchsin agar, both white and red colonies appeared. Here we have an example of true dissociation with salicin red forms developing in liquid and solid medium in response to the stimulus afforded by the sugar.

In the case of raffinose we demonstrated a third type of reaction. Raffinose broth was not fermented by either Garrett, white, or Rimmer, white, even after 20 days, but both Garrett, red, and Rimmer, red, formed acid and gas in 4 to 5 days. When these red cultures were spread on raffinose agar both white and red colonies were demonstrated. Inoculation of the raffinose agar plates from the original inoculum produced colorless colonies. After 2 days Garrett red colonies showed many metallic

papillæ and after 4 days the Rimmer red colonies had also developed metallic papillæ. In this case we have an example of specialized fermentation of raffinose by the lactose red organisms due to the production of raffinose red descendants.

We plan to extend these studies to other strains. It is possible that we may be able to demonstrate dissociation to dulcitate, and since some of the white forms did ferment raffinose we would expect to obtain both white and red colonies on raffinose agar upon sub-culture.

In no case was the reaction of these organisms toward lactose altered. Salicin, red and white, and raffinose, red and white, organisms when sub-cultured to Endo's plates produced colonies characteristic of the original type. In other words, variation to lactose was not altered by contact with other sugars.

It seems possible that such a dissociation phenomenon may often occur and that slow fermentation of sugars should be investigated from this standpoint. It is not unlikely that certain difficulties in classification of some of these intestinal organisms could thus be eliminated.

An acidity developing in 2 to 4 days with the production of curds characterized the growth of all strains in litmus milk; no peptonization occurred.

Indol was formed in Dunham's peptone broth by the red and white forms of all strains.

Nitrates were reduced to nitrites and ammonia formed in nitrate broth. The methyl red reaction was positive, the Voges-Proskauer reaction negative.

Gelatin was not liquefied after 14 days.

AGGLUTINATION TESTS

Agglutination tests were carried out with the sera of 43 patients—5 sick babies, 13 healthy babies, 13 mothers, 10 sick adults, and 2 normal adults. For antigens we used heat killed saline suspensions of *B. coli mutabile*, Rimmer and Garrett, and *B. coli communior* from feces. We also immunized rabbits with the white and red forms of 9 strains of *B. coli mutabile* and tested their sera for agglutinins for homologous and related strains of *B. coli mutabile*, *B. coli communior*, *B. typhosus*, *B. paratyphosus* A and B. The results are summarized in Tables IV and V.

It is obvious that agglutinations on sera of babies do not offer proof of the etiological rôle of this organism. A higher percentage of the sera of sick babies than of well babies agglutinated this organism but our series is too small for conclusions. Fothergill⁸ was only able to offer serological evidence of pathogenicity in 2 cases of his series of babies suffering from diarrhea the stools of whom yielded atypical paratyphoid-like organisms. In view of the age of the infants it must be remembered that any agglutinins may not have been formed in

TABLE IV

RESULTS OF AGGLUTINATION TESTS ON SERA OF 43 PATIENTS WITH *B. COLI MUTABILE* ANTIGEN (RIMMER)

Highest Dilution of Serum Showing Agglutination

Group	Number	Neg.	1:20	1:40	1:80	1:160	1:320
Sick babies	5	3	1	..	1	..	..
Normal babies	13	8	3	1	1	..	..
Mothers .	13	1	..	1	5	6	..
Sick adults	10	2	..	2	3	3	1
Normal adults	2	..	..	1	1	..	..

response to an infection but may have been passively acquired from the mother.

Rabbits were immunized by introducing the antigen into the marginal ear veins. By giving the rabbits 2 series of 5 injections at 1 day intervals with an intervening rest period of 5 days we were able to produce high titers of agglutinins. We can offer no exact results—it may be stated that some of our strains were highly toxic to rabbits when injected in the fresh state and we used heated cultures for most inoculations.

While rabbits were immunized with 9 cultures and the sera tested with heat killed antigens prepared from all strains, no attempt is made to present the complete results because of the involved charts necessary.

A striking serological relationship was demonstrated among all strains of *B. coli mutabile* isolated from sick babies. The sera of rabbits immunized with any one strain agglutinated all antigens to approximately the same titer. No marked antigenic differences between the white and red organisms were apparent. In most cases the red organisms were agglutinated to higher titers than the white—even by white sera. This happened after every effort had been made to prepare red antigens in a manner

that would eliminate any tendency toward spontaneous clumping because of the granular character of growth.

No close antigenic relationship existed between our *B. coli mutabile* strains and *B. coli communior* isolated from feces during routine examination. Likewise there was no marked cross-agglutination with typhoid or paratyphoid organisms.

Table V presents a summary of some of our serological tests.

SUMMARY

1. *B. coli mutabile* was isolated from the stools of 67 per cent of new-born babies suffering from an unrecognized type of diarrhea.

2. Stable lactose fermenting and unstable non-lactose fermenting (in that lactose fermenting descendants continued to be given off) could be derived from all cultures.

3. Dissociation to the lactose fermenting form occurred under stimulation of contact with lactose. Lactose exerted a specific effect since no other condition of growth produced the same result.

4. Utilization of salicin and raffinose was shown to be similar to that of lactose and depended upon the development of variants capable of fermenting these sugars.

5. Biologically the organisms are closely related to *B. coli communior*, but no close antigenic relationship was demonstrated.

6. All strains of *B. coli mutabile* isolated from sick babies were found to form a homologous group when tested with sera of rabbits immunized with red and white forms.

7. Substantial proof that *B. coli mutabile*

TABLE V

SHOWING RESULTS OF AGGLUTINATION TESTS WITH SERA OF RABBITS IMMUNIZED WITH
B. COLI MUTABILE AND OTHER INTESTINAL ORGANISMS

Titer to Which the Following Antigens Were Agglutinated

Sera	Russell White	Russell Red	Terrell White	Terrell Red	Garrett White	Garrett Red	Byrd White	Byrd Red	Para A	Para B	Ty- phoid	Coli Com- munior
Russell White	10240	10240	5120	5120	1280	10240	10240	10240*	40	40	40	80
Russell Red	10240	10240	10240	10240	1280	5120	5120	10240*	40	40	40	80
Terrell White	1280	5120	2560	5120	640	5120	2560	5120	40	40	80	160
Terrell Red	2560	10240	2560	10240	1280	10240	5120	10240	40	40	40	40
Paratyphoid A	40	40	40	40	40	40	40	40	5120	320	640	40
Paratyphoid B	40	80	40	40	40	80	40	160	320	10240*	1280	160
Typhoid	80	80	40	80	40	40	40	40	320	320	10240	80
Coli communior	80	160	160	80	80	80	160	160	40	40	40	320

* Titer not reached

was the cause of the outbreak of infant diarrhea is presented, but it is admitted that the predominance of these organisms may have been secondary and an unrecognized organism the primary cause.

REFERENCES

1. Neisser, M. *Centralbl. f. Bakteriol.* (Abt. I, Ref.) 38:98, 1906.

2. Massini, R. *Arch. f. Hyg.*, 61:250, 1907.
3. Kriebel, Ruth. *J. Bakt.*, 27:357, 1934.
4. Jones, F. S., Orcutt, M., and Little, Ralph B. *J. Bact.*, 23:267, 1932.
5. Kennedy, J. A., Cumings, P. L., Morrow, N. M. *J. Infect. Dis.*, 50:333, 1932.
6. Nungester, W. J., and Anderson, S. A. *J. Infect. Dis.*, 49:454, 1931.
7. Lewis, I. M. *J. Bact.*, 28:618, 1934.
8. Fothergill, LeRoy D. *J. Infect. Dis.*, 45:393, 1929.

Oh Enema!

*Un petit clystere insinuatif, préparatif
et remollient pour amollir, humecter, et
refraîcher les entrailles de Monsieur.*
—Molière

IT is said that the enema habit was introduced into England from France early in the nineteenth century. I have searched my library of English health books which goes back to 1589 and find the first references, with the exception of one author, in 1807 and in 1828. The exception is Francis Bacon, Lord Verulam (1550-1626), in whose writings I have found three references to the "clyster" which was the English word for enema in his time and is, you will note, practically the same word as used by Molière. But Lord Bacon was unusually erudite and there is no doubt that the enema was more popular at that time in France than in England. Sir John Sinclair (1807) notes that, on page 284 of the

Manual of Health, "there is an amusing story connected with the subject of lavements, regarding the lively and amiable Duchess of Burgundy who was the Rosalind of the court of Louis XIV and who was accustomed to take them previous to her going to the theater."

Unfortunately I have never been able to find that Manual of Health. But the word lavement which is the modern French for enema has had an unfortunate influence on our practice. In the Anglo Saxon tradition a washing demands soap and so to the ancient clyster or glyster soap was added, as it never had been before, and colons suffered in consequence. Doctor Hurst believes this evil practice still to be limited to the British Isles. Alas we know better.—J. Rosslyn Earp, Dr.P.H., *New Mexico Health Officer*, Aug., 1935.

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THE SIXTY-FOURTH ANNUAL MEETING

THE 64th Annual Convention of our Association is a thing of the past. The meeting in Milwaukee will go down as one of record. The attendance was next to the largest which we have ever had and the largest by far since the registration fee has been charged.

Of the arrangements made for our comfort and the efficiency with which they were carried out, it is impossible to speak too highly. The Milwaukee Auditorium, although not so new as some others, and perhaps not quite so big, is most admirably fitted for a large meeting, with an abundance of halls in which the acoustics are excellent.

The service was the best that we remember. Each room was supplied with one "monitor" and often two. In every meeting room there were lanterns, an officer to turn the lights on and off and another to operate the projection apparatus, so that it was a matter of a minute at most to go from lantern slides to text and back again. For the first time admission to the halls depended on the official badge and these monitors gave great assistance in protecting the sessions from the idle curious.

The Auditorium is abundantly provided with rest rooms and toilets, and there was also a good restaurant for simple meals, so that one could spend the entire day without returning to the hotel which was headquarters—some two blocks away. All meetings were held in the Auditorium and all breakfasts, luncheon meetings, dinners, and banquets at the Hotel Schroeder.

Our meeting was preceded by The Health Education Institute which has come to be an established feature. The attendance was 128. The general subject taught this year was "Health Education Applicable to Smaller Communities."

For the first meeting day, Monday, the 7th, there was a large attendance, running to 1,600 by noon. Our total attendance was 2,041. The programs, of

which we believed we had a full supply, were exhausted on the second day of the meeting. In spite of the abundant provisions made by the Local Committee, all registrations for all the inspection trips were in excess of the facilities. The banquets, luncheons, and dinners were all over-subscribed. The meeting rooms were full and on some occasions the session had to be adjourned while larger halls were made ready for the audience. All of this was true in spite of the fact that the arrangements were better than we have ever had before.

Among the unusual features was a tea at the Schroeder Hotel given by the Local Committee on Sunday, October 6th, which was tremendously attended. A Tyrolean orchestra was provided, with excellent singers, in costume. Special Tyrolean dances beautifully done and most entertaining were given. The guests sat at tables and feasted. In addition, at 6:00 o'clock in the evening the Local Committee gave a dinner ostensibly for the Governing Council, but all members of the Association who were present were invited. Again we had delightful music and special dancing by local artists.

On Monday evening, the first General Session was held. The welcome was given by Daniel W. Hoan, who has been Mayor of Milwaukee for some 20 years, and who has made of Milwaukee one of the safest and most prosperous cities in the United States. Address of the President of the Association, Dr. E. L. Bishop, followed. A most unusual and delightful feature was the presence of the Honorable Josephine Roche, Assistant Secretary of the Treasury, in charge of public health, who gave an excellent address. The Sedgwick Memorial Medal was awarded to Dr. Haven Emerson of New York, the presentation being made by Dr. William H. Park, a former recipient of the medal. The meeting ended with the usual reception and dance.

On Tuesday night a banquet at which approximately 900 people were seated was provided through the courtesy of the Krim Ko Company of Chicago. A most witty toastmaster, Judge John C. Karel, introduced those sitting at the head table, one by one, speaking to the Mexicans in Spanish, the French-Canadians in French, the Poles in Polish, and to Americans in Americanese. The occasion ended with the singing of well known German songs in which the entire audience joined.

On Wednesday night the annual banquet was attended by more than 600 persons. Dr. Walter H. Brown was inducted into office as President, and gave a scholarly address. A pleasing incident was the presentation by the State and Provincial Health Authorities of North America of an Honorary Life Membership to the retiring President, Dr. Bishop. Dr. C. A. Harper, Health Officer of Wisconsin, the oldest state health officer in this country in years of service, made the presentation in the name of that society.

The exhibits, both commercial and scientific, were unusually large and well prepared. Among the scientific exhibits, citations of merit were awarded to the Marquette University School of Medicine, the University of Wisconsin and State Board of Health of Wisconsin, Laboratory of Hygiene, the Commonwealth Fund of New York, the Wisconsin Anti-Tuberculosis Association, the Milwaukee County Chapter of the American Red Cross, and the American Medical Association of Chicago, Ill. The exhibition halls were at practically all times well filled, and one was forced to the conclusion from the attendance at the meetings in general, the number and size of the commercial exhibits, and the interest shown in them by the public, that conditions throughout the country are better than for several years.

Among the distinguished visitors was Dr. Einar Rietz, Health Officer of Stockholm, Sweden, who addressed a dinner session of the Health Officers. From Mexico we had a single representative—Dr. Angel de la Garza Brito. Our sister republic on the North was better represented than usual. From several provinces we had 17 distinguished men headed by Dr. R. E. Wodehouse, Deputy Minister of Health. From Ottawa came also Dr. Norman Harris, Director of Hygiene of the Federal Department of Health, Mr. Lancaster of the Food and Drugs Department and Mr. Tracy of the Bureau of Vital Statistics. Montreal was represented by its distinguished Health Officer, Dr. Boucher and his Sanitary Engineer, Mr. Cousineau. The Connaught Laboratories sent Dr. Defries, accompanied by Professor Don Fraser. McGill University was represented by Dr. Grant Fleming, Professor of Hygiene.

Dr. Gordon Jackson, the successor of Dr. Hastings, for many years a member and past president of the Association, came from Toronto. The Ontario Department of Health was represented by Dr. John T. Phair. From far Quebec Dr. E. Langevin of the Provincial Department of Health came. We regret that a number of familiar faces were missing.

The Metropolitan Life Insurance Co. sent its representatives, Mr. Burnette and Miss Alice Aherne from Ottawa.

We must express the most sincere appreciation for the coöperation given to us by the local and state authorities as well as by all other agencies. An excellent performance must be recorded on the part of the press and the radio—national, state, and local.

We offer our most sincere thanks to Dr. John P. Koehler, Chairman of the Local Committee, to whose untiring efforts and efficiency the success of the meeting has been largely due. His unfailing courtesy and foresight made the way smooth and pleasant for all of those in attendance. Milwaukee will long be remembered for its bounteous hospitality.

TRIALS OF THE HEALTH OFFICER

A RECENT occurrence in California gives an idea of what health officers may meet with in carrying out their duties. In the spring of 1935, a bakery which sold and distributed bread in San Francisco put out a whole wheat product, on the wrapper of which were the words "Relieves Constipation Nature's Own Way." Newspaper advertisements carried the same phraseology.

The Director of Public Health of San Francisco believed that this was a violation of a section of the Pure Food and Drug Law of the city and county, as well as of a similar section of the Pure Food and Drug Act of the State of California. A conference of those concerned in the baking industry, at which there was also a representative from the State Board of Food and Drug Inspection, was called and held at the Department of Public Health. Free discussion took place. The baking plant involved agreed to remove the phrase "Relieves Constipation Nature's Own Way" from its advertising and also from the bread wrappers. An executive order was issued by the Director of Public Health prohibiting the sale and distribution of bread and other bakery products so labelled as to indicate that the use of such products would relieve constipation and that the said products possessed laxative properties.

Soon after, the bakery in question revived its advertising campaign, con-

fining itself to bill-boards and newspapers. The phrase "Avoid Constipation the Natural Way" was substituted for the older one. The Department of Public Health held that the meaning was practically the same.

The advertising agency employed by the bakery challenged the legality of the executive order issued by the Director of Public Health, and the matter was referred to the City Attorney, with the following result:

The city attorney holds that the Director of Public Health cannot prohibit the distribution of this bread by virtue of an executive order; and any order of the Director of Public Health must be predicated upon the provisions of an ordinance enacted by the legislative branch of the city government, to wit, the Board of Supervisors. The second part of the opinion of the city attorney relates to the validity of the label now used by this Baking Company, namely, the use of the phrase "Avoid Constipation the Natural Way." In the opinion of the city attorney the use of the expression "Avoid Constipation the Natural Way" is of such a generic type as to fall within the category of trade exhortation or invitation rather than positive declaration as would be assigned to statements as "cure" or "relieve" constipation.

The bread in question is a whole-wheat bread containing, besides the natural ingredients, honey and an ingredient—so-called secret formula—claimed to impart to the bread its alleged virtue in relieving constipation. A report from a private laboratory concerning this ingredient is couched in the following language: "A concentrated plant product which has cathartic properties, and when used in specified amount in bread has a mild laxative effect without harmful or unpleasant after effects. Sample as submitted contains no toxic or harmful constituents when used in proper amount."

The Department of Public Health of the city and county of San Francisco is not convinced, and still holds the opinion that such bread is not necessary in the American dietary, and, further, that the advertising used in this sales campaign will have a prejudicial effect upon the consumption of bread.

THE OPEN FORUM

REGINALD M. ATWATER, M.D.

Executive Secretary, American Public Health Association

"TWENTY-FIVE YEARS OF LIFE CONSERVATION"

THIS publication from the Metropolitan Life Insurance Company is unique in its field. It is a record of the organized welfare work of the company on the occasion of the 25th anniversary of the establishment of this Welfare Division but it has much wider significance. It illustrates well the great possibilities of conserving human life inherent in the institution of life insurance. This record also presents striking evidence, as the foreword points out, of the important interrelations which must exist among all groups working to protect health and to extend life. In recognizing the contribution of the public health profession toward these achievements there is an added word of recognition which organized public health owes to the pioneering leadership of the late Dr. Lee K. Frankel and his associates who have so ably furthered the development of many activities both within and without the company itself. As a means of interpreting the life-saving facts of medical science and passing them on to the public in words they can understand, this record is very significant.

In these 25 years—

... the people of America have experienced war, pestilence, flood, drought, unprecedented extremes of heat and cold and a valley of deep depression. Yet, in this quarter century more than eight years—3,000 days—have been added to the average life span of the general population and this "vast gift of days" has gone chiefly to the young.

I know of no better condensed summary of the progress of public health

during this period than that in this publication, which is well illustrated with understandable graphs of tuberculosis, typhoid fever, diphtheria and infant mortality. It would be an excellent text book for educational classes, for it shows what applied science can do in the extension of life. The place of this Association and its committees is well described. It is worthy of note, as the 15th birthday of our Committee on Administrative Practice is being celebrated, that the original grant for the purposes of this committee came from the Metropolitan, which has made grants each year since for the purposes of the Association. Those wishing to secure copies should write Dr. Donald B. Armstrong at One Madison Avenue, New York City.

WHITE ELEPHANTS

NOT a few health agencies have turned the present difficult economic situation to their own great profit by securing gifts of properties suitable for their purposes from persons and estates which regarded these possessions as great burdens. It has been most gratifying to note with what an enthusiastic welcome the idea of a gift has been received by some of the prospective donors who, tired of the mounting tax bills, and eager for some solution, find that a gift to such an agency provides a splendid chance to help public health and get out from under a difficult problem. From the standpoint of the agency it is often possible so to arrange the ownership of the property as to provide for tax-free

use and in this manner to free funds previously used for rent on quarters perhaps much less suitable for the purpose of the organization.

Sometimes it is possible to find a residence of the type popular some years since which is well located and capable of arrangement to accommodate a health center. It is surprising how the use of a few partitions and redecorating can transform one of these buildings into a place suitable both for health department offices and clinic purposes. Not infrequently the whole atmosphere of a department can be raised through such a new provision of space and the health department sometimes profits greatly by separation from certain other governmental agencies which still are known for their partisan political activities.

In other places it has been possible to provide through such gifts of residence property a community center where most of the health and welfare offices may be consolidated. The testimony of some who have tried it indicates that it does a health department staff no harm to see their colleagues in welfare and character-building agencies at frequent intervals. Such a plan serves to emphasize the essential community of interest between officials of the city or county and the executives of health and welfare associations, the visiting nurse group, the Red Cross, the Boy Scouts, and similar agencies. Often the coöperation of service clubs, community chests, etc., can be readily obtained to make it a community unit of large significance.

This type of project has been accomplished in numerous communities from California to New York. It might be achieved in a good many other places if this idea could strike fire in the mind of somebody who would take advantage of this difficult time and perhaps be responsible for opening a new door for health service in his locality.

HEALTH ADMINISTRATION IN NEW YORK STATE

THERE has come to my desk a recently published outline of the administrative procedure in the New York State Department of Health, published in connection with the Extension Course in Public Health given by the department and of which Dr. Don M. Griswold is in charge. Those interested in the description of the routine in this outstanding state department will find each division explained as to its objective and methods. There are illuminating diagrams of the division of responsibilities among the large state staff and their relationships with the 796 local health officers serving 1,222 health districts. Dr. Griswold advises that he is interested in an interchange of information with other departments on this subject. This outline should prove valuable to other administrators and to those teaching public health administration.

IF AND WHEN

SO many questions are in the minds of health officers and others these days about the terms on which grants will be made to states for maternal and child welfare under the Social Security Act that it seems desirable to call attention to an enlightening document on the subject. "Grants to States for Maternal and Child Welfare under the Social Security Act" has been published by the Department of Labor for the Children's Bureau. This publication, which is obtainable from the Superintendent of Documents at 10 cents, describes the provisions of parts 1, 2, and 3 of Title V of the act on Maternal and Child Health Services, Services for Crippled Children, and Child Welfare Services. The anticipated apportionment of funds to the several states is described and the special allowances to each state for ratio of rural population to total rural population will be in-

teresting in view of the special rural provisions of the bill.

RURAL APPRAISAL FORM

DURING the past year there have been more systematic appraisals of rural health services than ever before, due largely to the new Rural Health Conservation Contest sponsored by the United States Chamber of Commerce in coöperation with this Association. Repeatedly it has been evident that the *Rural Appraisal Form* as published in 1932 has been useful and stimulating to health officers in objectifying their own work and for purposes of comparison with other records. Many of those who have used these forms have pointed out what seemed desirable directions for improving the appraisal schedule and careful note has been made of these suggestions.

Now preparations are under way for the revision in 1936 of this schedule and the time is ripe for those who have ideas on this important subject to send them in. I am sure that by this type of coöperation we all can profit through a more adequate appraisal form for years to come. Send in your suggestions. They will be carefully considered by the committee. I can loan you a copy of the *Rural Appraisal Form* if you wish.

PUBLIC HEALTH AND RACE PROGRESS

THE following editorial is reprinted by permission of the Editor of the *New York Times*, from the issue of Friday, September 27, 1935. It is an answer to one type of critic familiar to the health officer:

"PROTECTING THE UNFIT"

The president of Colgate University is worried. "Nothing could threaten the race," he tells us, "as seriously as social legislation. It is begging the unfit to be more unfit and inviting the fit to join the ranks of the unfit." The sins of the philanthropists are equaled only by those of the doctors, who have "done everything they could to keep

the unfit" and to curb "nature's natural checks." He wants us to weed out the feeble-minded, and he fears that even old-age insurance "removes one of the points of pressure which has kept many persons up to the strife and struggle of life."

A curious aroma of nineteenth-century evolutionism floats over these strictures. Perhaps if Dr. Cutten studied the matter a little further he would be less disturbed. What are the crimes that doctors and social legislation have committed? One of their greatest achievements has been a material reduction in the infant mortality rate. In New York City, for example, there was a steady reduction from 113 per 1,000 births in 1910 to 53 per 1,000 in 1933. How has this been achieved? Through increasing precautions to insure a clean, safe milk supply. By increasing knowledge of hygiene, the provision of visiting nurses, medical supervision and advice for expectant and nursing mothers. By increasing knowledge of how to combat specific diseases. There is no evidence whatever that any of these measures have weakened the stock.

What has been done by social legislation in industry? First, there is factory inspection, to insure sanitary conditions, air and light, fireproof buildings. Next there are measures limiting excessive hours of work, night work for many women, child labor. Do these measures increase the number of unfit? Finally, there are the measures, long known to Europe, now just being introduced here, to provide unemployment insurance, old-age insurance and unemployment relief. Of these the first two hardly do more than mitigate somewhat the evils and insecurities that at some time or other affect the majority of us. Only the last can be said to be a measure to "protect the unfit," and then only if it is continued indefinitely. There is no evidence to show that the great majority of the present unemployed are any more "unfit" than the majority of the employed. And if Dr. Cutten is doubtful over old-age pensions—to people over 65—because it "removes one of the points of pressure which has kept many persons up to the strife and struggle of life," he ought surely to be even more doubtful about allowing vigorous young men to inherit enough wealth so that they do not have to work at any time.

"Nature," Dr. Cutten tells us, "provides immunity to certain diseases by eliminating all those who contract the diseases. Now we have a protected race rather than a resistant race." But the creation of protections is almost a definition of civilization

itself. If we were to carry Dr. Cutten's argument to its logical conclusion, we should abandon our present efforts for assuring an uncontaminated water supply, which has done so much to eliminate typhoid and cholera, and give up such fancy services as food inspection, drainage and sewage disposal. As soon as we heard of an epidemic we should, on the contrary, expose everybody to it to make sure that the unfit were eliminated. Perhaps even that would not do much good. Dr. Cutten may be discouraged to learn that

geneticists have calculated that even if all the feeble-minded of this generation could be sterilized it would reduce the feeble-minded of the next generation by only one-tenth to at most a fifth.

EPIGRAM

"There is more true motherhood in giving children toxoid than in embroidering their petticoats these days."
--Elizabeth Cook.

BOOKS AND REPORTS

The Principles and Practice of Medicine—Originally written by the late Sir William Osler, M.D. Revision by Thomas McCrae, M.D. New York: Appleton-Century, 1935. 1196 pp. Price, \$8.50.

Few books have ever enjoyed such popularity as this, the preface to the first edition of which is dated January 1, 1892. It has been copyrighted 18 times. Since the death of Sir William Osler the revisions have been prepared by Dr. Thomas McCrae, and the present 12th edition has a peculiar and sad significance in the death of Dr. McCrae on June 30 of this year, just after the book appeared.

This edition has been completely reset and a new type adopted which is not only considered easier to read, but allows more words to the page. The preface points out changes and additions in practically every part of the book, but especially in the discussion of diagnosis and treatment. Some new sections have been added and others materially altered. A list of these given in the preface makes for easy comparison.

It would require a great amount of boldness to criticise a work which has been so thoroughly reviewed in every part of the English speaking world and has remained a standard for so many years.

We have always felt that proper treatment of contagious diseases, with isolation and scientific disposal of the discharges of the body played a great part in prevention. It goes therefore without saying that those engaged in public health work should have a sound knowledge of disease and the handling of cases. We know of no book which

can be recommended more fully for this purpose than the one before us. The printing and make-up are excellent.

MAZŸCK P. RAVENEL

New and Supplementary Facts and Figures About Tuberculosis—By Jessamine S. Whitney. New York: National Tuberculosis Association, 1935. 46 pp. Price, \$.50.

The present edition is issued so as to make available revised and more recent data, and additional matter.

As the title implies, the booklet is confined mainly to statistics; there is no text, except for introductory comment in the section on tuberculin tests. The 36 tables fall, in the main, into the following classes:

(a) Mortality from tuberculosis, and its variation with age, race, sex, form of disease, time and place (22 tables);

(b) Tuberculous infection: seven tables showing the results of tuberculin tests, in various age groups, by sex, as reported by various observers in the scientific literature;

(c) Miscellaneous data concerning hospital beds, stage of disease on admission to sanatoria, volume of tuberculosis nursing service, and seal sale receipts.

Anyone interested in tuberculosis will want to have a copy of this useful publication constantly at hand. The question might be discussed whether its usefulness might not be enhanced by the addition of graphs for some of the age and time series. For example, the interpretation of Table 5, showing percentage decreases in the tuberculosis rate by age-sex since 1922, would be aided greatly by a graph.

A. W. HEDRICH

Children's Dentistry in Honolulu: Report of Palama Settlement Dental Clinic for School Children, 1934—By *Mervyn I. Conner, D.D.S., Dental Director*. 24 pp.

Dental service at Palama Settlement, Honolulu, is reported for 1934 by Mervyn I. Conner, D.D.S., Dental Director.

Forty-nine per cent of the pupils in the first 5 grades were deemed eligible by the dental hygienists for clinic service. The fees paid by the children amount to 4 or 5 per cent of the cost of the service. The clinic is supported by the "Strong Foundation." The service clinic in coöperation with the public school staff of dental hygienists succeeded in securing dental care for 85 per cent of the pupils attending the first 5 grades. The remaining 15 per cent were not cared for but are accounted for in the report. This is probably as complete a service as can be obtained at reasonable expense and is entirely satisfactory from the public health viewpoint. The clinic cared for 7,444 at an annual cost of \$4.71 per pupil in 1934.

Since 1920, this institution has steadily progressed in service to the community. May it continue.

HARRIS R. C. WILSON

Survey of the Ohio State Department of Health, 1935.

A survey of the Ohio State Department of Health has recently been completed, as part of the Ohio Government Survey, initiated by the Governor, Martin L. Davey.

The report on the Department of Health was prepared by the following committee: Dr. J. A. Doull, Western Reserve University, *chairman*; Howard Whipple Green, Cleveland Health Council, *secretary*; George Gascoigne, consulting engineer, Cleveland; Miss Marion G. Howell, Dean School of Nursing, Western Reserve University,

Cleveland; and Dr. A. Graeme Mitchell, University of Cincinnati. The Committee was assisted by Miss Pearl McIver, U. S. Public Health Service, who surveyed the Nursing Division; A. W. Hedrich, Sc.D., Johns Hopkins University, who surveyed the Vital Statistics Division; and Mr. A. A. Keiser, of the National Cash Register Co.

A historical sketch outlines the creation of the Board of Health in 1886, and the gradual development of administrative divisions; the reorganization in 1917 into a State Department of Health, headed by a Public Health Council and a Health Commissioner selected by them to serve a five-year term; and another re-organization in 1921, whereby the Health Commissioner was replaced by a Director of Health, appointed by, and serving at the pleasure of, the Governor. In the same re-organization, vital statistics functions were transferred from the office of the Secretary of State to the Department of Health. The Commissionership has changed hands frequently in recent decades, but the Assistant Commissioner has been in office nearly forty years.

There are, at present, six Divisions of the Department: Administration, Communicable Disease (including Bureaus of Venereal Disease, Tuberculosis, and Blindness Prevention), Vital Statistics, Laboratories, Hygiene (including Bureaus of Occupational Disease, Child Hygiene, Maternity Hospitals, and Dental Hygiene), and Sanitary Engineering.

As has occurred in other states, the Department suffered a severe reduction in appropriations, illustrated by the following comparison of expenditures in 1930, the peak year, and in 1934:

Year	Total Subsidies to			
	Expenditures	Local Depts.	Personnel Services	Maintenance
1930	\$630,560	\$251,098	\$276,561	\$102,901
1934	378,048	150,000	178,486	49,561

It is seen that the total expenditures declined by 40 per cent, subsidies to local health departments the same proportion, personnel services 35 per cent, and maintenance, 52 per cent. Personnel was cut from 137 persons to 92: the nursing staff was cut from 14 persons to 3; and there were dropped 8 stenographers, 5 chemists, and 4 physicians, along with other personnel.

The Committee found that, on the whole, the Department was efficiently and economically conducted. For example, the laboratory cost of performing the conventional double test for syphilis was approximately 21 cents; at commercial rates the cost would have exceeded the entire budget of the Health Department. The central office expense for registering births and deaths (not including county fees to local registrars) was about 15 cents per certificate, compared with a cost of registering animals in appropriate registries of \$1 to \$3 for hogs and sheep, to as high as \$4 to \$20 for horses. Accordingly, whereas further cuts in budget aggregating five millions were recommended by committees for other departments of the government, the Committee on Public Health felt obliged to recommend increases for the Department of Health proper, as follows: salaries and wages, \$16,260; maintenance, \$1,851. It was, however, recommended that subsidies to local departments be reduced from \$150,000 to \$125,000.

Perhaps the most important recommendation of the Committee was that, subject to approval of the Public Health Council, the Director of Health be given a free hand in the allocation of local subsidies, according to the needs of local communities. This policy would enable him to promote the consolidation of health districts and in other ways stimulate efficiency and economy. This, and other recommendations are in harmony with those

made by Dr. Joseph W. Mountin in a Report of the Governor's Commission on County Government, submitted in December, 1934.

Among other recommendations are:

That the term of the Director of Health be made indeterminate; that he shall be subject to removal only for incompetency, misbehavior, or age limitation; and that appointment and removal by the Governor be subject to approval of the Public Health Council; retention of the present Director is recommended;

That the "exemption privilege," permitting an incoming Director arbitrarily to remove three employees from the classified list, be abolished;

That a second Assistant Director of Health be appointed; the first Assistant would then have charge of administrative activities, such as personnel, legislative, purchasing, and publicity; the second Assistant would have charge of local health organization and preventive medicine activities. Divisions reporting directly to the Commissioner would be Vital Statistics, Laboratories, and Sanitary Engineering;

That additional personnel be provided, including an epidemiologist at \$3,600, a dental health officer at \$3,600, a nursing supervisor at \$2,500 to \$3,000, and three public health nurses, aggregating \$5,400;

That a new state laboratory be constructed, and that the Division undertake histo-pathological and toxicological examinations; and

That the food and dairy activities of the Department of Agriculture and inspection of hotels and restaurants by the Fire Marshall be transferred to the Health Département.

Recommendations were made to individual Divisions concerning procedures, for example, the use of labor saving machinery, elimination of duplications, speeding up of certain operations, and the like. A. W. HEDRICH

A New Angle on Health (Nature's Provision for the Health and Happiness of Mankind) — *By Surgeon Captain D. H. C. Given, M.D. London: John Bale, Sons & Danielsson, Ltd., 1935. 160 pp. Price 7s. 6d.*

This book is a sincerely written essay, containing much that is of interest. The author attributes much evil to modern industrialism and the consideration of "self before service." He holds that "Nature is merely the kingdom of God upon earth," and that "Nature's simple recipe for health and happiness inevitably brings one back to the Sermon on the Mount." He concludes by expressing his conviction that "the precepts of Christianity are the only basis of a healthy and happy life."

The book has a number of interesting charts, tables, and illustrations. The printing and make-up are excellent.

We believe that it is better suited as a religious tract than as an essay on hygiene. MAZÛCK P. RAVENEL

Making Our Minds Behave—By William S. Walsh, M.D. New York: Dutton, 1935. 277 pp. Price, \$2.50.

Having been favorably "conditioned" by the sympathetic, approving, and even enthusiastic reviews of this author's books he has seen in the newspapers in the past, this reviewer picked up the present work (the first he has read) with confidence and expectation that here he would find a satisfactory exposition and interpretation of mental hygiene principles and their practical application to everyday life, but he was soon disappointed. It starts off promisingly with an instructive discussion of the relations of emotion to mind, of mental mechanisms like rationalization, of the inferiority complex, of ego and sex drives and one or two other psychobiological

fundamentals, but after the first two or three chapters this mental hygiene content peters out and the book trails off into the popularized, inspirational treatment of "psychological principles" with which we are all familiar.

It can hardly be said to be, as the publishers call it, "a study of psychology and psychoanalysis." Except for this limited presentation of some of the concepts of the new psychologies, the contemporary setting of many of the illustrations and object lessons, and the use of current idiom, the book might have been written twenty years ago.

One wonders what the secret of success of this author is, unless it be his marked ability to talk to his readers in easy, American vernacular, and to supply them with a type of psychological material for which there is apparently still great demand, for he knows what they want and what to give them and how. He writes clearly, simply and interestingly, and tells them much that is sound, sane and sensible, though also much that is trite and even banal.

It is a little disappointing that a physician, who is also a serious student of human behavior and the social sciences, with a gift for popularization that could be turned to good account in the manipulation of sterner stuff, should devote the major part of a work on the science and art of mental hygiene to such shop-worn topics as the art of concentration, self-expression, personal popularity, second-hand thinking, "mental engineering," and "making good on the job." Dr. Walsh might have left to the vocational psychologist and the efficiency experts, for example, the business of advising the young graduate from high school or college how to apply for a job.

There is great need for mental hygiene literature of the self-help type for the laymen. There is already a

large and growing literature for the parent and teacher with reference to the training of the young, but little as yet of a sound and practical nature for the adult himself. It is a paradox that the more successful of our popular books on psychology should be so thin and unsubstantial, and the solid and more valuable material of mental hygiene, educationally speaking, so poorly prepared for popular consumption, when it is available at all.

PAUL O. KOMORA

Child Nutrition on a Low-Priced Diet—By *Mary Swartz Rose and Gertrude M. Borgeson*. New York: Bureau of Publications, Teachers College, Columbia University, 1935. 109 pp. Price, Paper, \$1.00; Cloth, \$1.50.

In this monograph of the Child Development Series the authors have described fully, and clearly, the results of an intensive study of certain phases of nutrition in a group of 60 preschool children maintained on a uniform low priced diet for 21 months, and 19 of the children subsequently kept on the same diet for 10 months longer. The study was carried out as a coöperative research project of the Child Development Institute, various departments of the College and University and of a social welfare organization.

The children were under Day Nursery supervision and were divided for purposes of study, into two groups matched as nearly as possible as to age and sex. The diet of one group was supplemented by an egg a day for each child. Careful supervision by a nutritionist and physician was maintained throughout.

The principal conclusions are as follows:

1. The uniformity of the health progress of the two groups.
2. The efficiency of a very inexpensive diet for young children if chosen with knowledge

of nutritive values, and administered with due regard for ease of digestion and regularity of food consumption.

3. Milk furnished on the average 36 per cent of the total calories.

4. The total cost of the diet without eggs averaged about 1.6 cents per 100 calories.

5. The differences in growth of egg and no-egg groups were not significant with respect to either height or weight.

6. No differences in growth, general health status, or hemoglobin and red cell values of the blood could be attributed to the added orange juice.

7. No special benefit from the substitution of liver for egg could be detected.

This work merits careful consideration and should be read by all those interested in child development.

One would like to see similar studies carried on for preschool children in other parts of the country, as reports have been coming in that this age group has suffered more severely during the depression than any other.

RICHARD A. BOLT

Health Dentistry for the Community by the Committee on Community Dental Service of the New York Tuberculosis and Health Association — Edited by *Michael M. Davis*. Chicago: University of Chicago Press, 1935. 85 pp. Price, \$1.00.

This volume brings together much valuable information as to what is being done for both children and adults in the matter of dental service for the financially less fortunate. The various problems are discussed freely and frankly. It will be found most readable and enlightening if not entirely pleasing to the conservative mind. Some suggestions are made for the solution of dental problems for all the people.

This volume will be of value to any committee or group planning for community dental service.

HARRIS R. C. WILSON

A Square Deal for the Narcotic Addict—By *William H. Ladue, M.D.* Published by the author. *Plattsburgh, N. Y.: The Tuttle Printing Office, 1935.* 131 pp. Price \$1.00.

This book is chiefly a discussion of narcotic addiction, on which a large amount of good material is given. The object of the author is to compare drug addiction and the hysteria which it has engendered with alcoholism and our complacent attitude toward it. In one chapter called "A Double Standard," he discusses the marked discrepancy between the social significance of alcoholism and drug addiction, and holds that the public conscience acts as though aroused to the higher degree by the lesser irritant. The author holds that drug addiction is not a menace; that there is not an "institution, a vital component of our life as a nation, that is tottering because of narcotics." There is no association comparable to the W.C.T.U. or the Anti-Saloon League to educate the public and fight the use of narcotics. There is no church standing at bay.

Narcotic addiction has been decreasing since about 1900, and this warrants a further trial of educational processes against it. Our attitude toward addiction is wrong, and the compulsory commitment of addicts is one of the most flagrant examples of the relative disregard of personal rights.

The writer disclaims any intention to advocate total relaxation of narcotic control or cessation of commitment, confinement, or punishment of selected addicts who have become a social problem. He holds strongly, however, to the idea that compared with the great alcoholic problem, narcotic addiction has nothing like the importance which has been given to it in the federal laws as well as those of the various states.

The book ends with an appendix

which gives a Digest of Essential Features Required in a State Narcotic Defense Law, proposed by the International Narcotic Education Association. The author makes out a strong case, and his book is well worth reading.

MAZÛCK P. RAVENEL

Common Sense for Mothers—By *Mrs. John S. Reilly.* *New York: Funk & Wagnalls, 1935.* 372 pp. Price, \$2.00.

The author, a mother of seven children, has tried in this book to give to other mothers the results of personal experiences and observations in the rearing of her family. Her counsel is wise and seasoned with a fine sense of humor. The material is well presented.

The author brings out that childbirth is a natural, normal function of woman; although attended by dangers which may be modified by early physical examination and supervision of a capable physician.

Mrs. Reilly places upon the mother a big responsibility for the care and character formation of her children. She feels that in order to do this job successfully, the mother must have good judgment and common sense. She says that housekeeping and the feeding of children has become almost a science; but the training of children is a much neglected field. Mothers have been expected to do this training without preparation. Wise parenthood requires more than good will and traditional ideas.

Adolescence is discussed as the age of transition. Some of the difficulties which confront parents at this time are mentioned.

The material organized in Mrs. Reilly's book is not new; but her method of presentation is somewhat different from other books in the same field, because she has lived in close association with her own family.

ELLEN D. NICELY

The Single Woman: A Medical Study in Sex Education—*By Robert Latou Dickinson and Lura Beam. Baltimore: Williams and Wilkins, 1934. 469 pp. Price, \$5.00.*

This book is one of the series in *Medical Aspects of Human Fertility* issued by the National Committee on Maternal Health and follows the authors' "A Thousand Marriages," published in 1932. The material for it is taken from the same sources, *i.e.*, patients seen in private practice by Dr. Dickinson during the forty years from 1890 to 1930. The point of view is not the narrow one of the specialist, whom the sceptic may accuse of finding what he is looking for, but that of "the family doctor plus the anatomist plus the specialist in the diseases of women." For this reason the book is a social as well as a medical document, and raises more questions than it answers. The single woman has sexual problems, but so does the married woman, and often they are not so different in their actual essence. Frustrated in its normal biological functioning, sexual energy seeks other channels of expression. What direction it takes, whether it remains at the level of physical expression or seeks other outlets, in "work, the arts, religion, family or other people," it is the entire personality of the woman that is involved, and not her sexual nature in the narrow sense. Sexual behavior is thus more of a psychological and social phenomenon than a strictly biological one, and can best be studied in relation to the social and economic currents of a particular epoch. It becomes, too, of paramount concern to education; "sexual illiteracy is costly."

No one in this country is better qualified to speak on such a subject than Dr. Dickinson. The material of the case histories has been skillfully handled, the conclusions are sane and

logical, and the book as a whole is an invaluable contribution to the literature of sex. WINIFRED RICHMOND

Nutrition Work with Children—*By Lydia J. Roberts (rev. ed.). Chicago: University of Chicago Press, 1935. 639 pp. Price, \$4.00.*

Those who have had Miss Roberts' 1st edition of *Nutrition Work with Children* on their shelves as a standard reference for 9 years will welcome this completely revised and considerably enlarged new edition. The present volume reveals an omnivorous appetite for keeping abreast of modern developments in nutrition and a digestive facility in reducing them to 639 pages. The results of modern nutritional research are presented clearly in a manner easily understood even by the uninitiated.

Each chapter is followed by a helpful list of references to original material. The clarity with which the author discusses the difficulties in assessing nutrition is refreshing. The chapters on the causes of malnutrition and the physical and mental effects of undernutrition are written especially well.

However, Miss Roberts has more than an academic interest in malnutrition. More than half of the book is given over to prevention and treatment. The various agencies which may be enlisted are described. The responsibility of the school for the health of its children is stressed, and a practical health program is outlined. The need for nutrition work in the preschool period is recognized.

"There can be no doubt," says Miss Roberts, "that an effective program of school and community betterment must begin back in the preschool period."

The format of the book is excellent, and the well chosen illustrations add considerably to its value.

RICHARD A. BOLT

Biology for Everyman—By Sir J. Arthur Thomson. New York: Dutton, 1935. 2 vols. 1,600 pp. Price, \$5.00.

The last fifteen years have seen quite a number of good, bad, and hack volumes on humanized knowledge. At times it was sufficient for a scribe with a flair for popular writing to read a number of books on a subject in order to produce a so-called outline. Of course, many of the outlines have not only imparted a great deal of accurate information, but have stimulated large masses to take a more intelligent interest in scientific, literary, and religious subjects. Thus, we had such works as the forerunner of all outlines, that of H. G. Wells on history, which must have had a tremendous influence on the entire field of adult education. Of this "Outline of History" the late Arnold Bennett was wont to say that the very conception on the part of the author was highly daring and the actual execution of the design was of course even greater.

The present work may not be exactly an outline, but whatever its name, it was something very much worth doing and few were better qualified for the task than the author of these two volumes. Sir J. Arthur Thomson, besides being a truly great biologist, brought to his task thirty years' experience, both as a teacher and writer, of natural history. Moreover, he always wrote so well that it is a real enjoyment to read what he had to say.

In "Biology for Everyman" the author gives us in 1,600 pages a vivid picture of living things, from amoeba to man; the plant world, heredity, sex and evolution are described and oriented with the rest. He does it with real charm and without the technicalities of the formal text books. The main sections of the work are divided into systematic sub-sections for the benefit of students, so that it may serve

as a reference or enlightened text book. There are also a good many subject references and cross references, 500 fine illustrations, and a valuable index of more than 80 pages. The job of seeing the manuscript through the press was done by Dr. E. J. Holmyard, scientific editor of "Everyman's Encyclopedia." Altogether, a fascinating work which will be read with interest, profit, and pleasure, especially by the lay reader. SAVEL ZIMAND

Modern Motherhood—By Claude Edwin Heaton, M.D., F.A.C.S. New York: Farrar and Rinehart, 1935. 271 pp. Price, \$2.00.

Dr. Heaton has given us a comprehensive book for mothers and prospective mothers presented in a direct, clear-cut style. It is thoroughly up-to-date in answering frankly every question a modern, intelligent woman is liable to ask. Even "The Expectant Father" is recognized as an important adjunct to modern motherhood. A unique feature of the book is the last section devoted to "Obtaining Adequate Maternity Care." In this is discussed the choosing of a doctor and a hospital, and the crucial question of the cost of maternity care. There is a very instructive chapter on the evolution of obstetrical care and a concluding chapter on "American Obstetrics" in which community responsibility is stressed. "Plainly a large majority of American parents," says Dr. Heaton, "belong to classes in need of a new deal in obstetrics."

"To recapitulate the main thesis of this book: the problem of maternal welfare in the United States is primarily a social and an economic one. Expectant parents who are able to avail themselves of the advantages of modern obstetrics may contemplate having a baby with serenity and confidence." A helpful bibliography and glossary are appended. RICHARD A. BOLT

Annual Report of Division of Sanitary Engineering—Georgia Department of Public Health, 1934—*Malaria Control*, pp. 18-25, inclusive.

A narrative report with tabulation of work accomplished on drainage, and employment figures, by counties.

The report of an organization aggressively engaged in the promotion, planning and supervision of work relief labor on drainage operations, rather than in conventional health department engineering functions of approving plans and specifications. The first section deals with a narrative of work operation and description of the administrative organization. It concedes that much of the work involved conflicts with professional malaria control principles, due to extreme limitations and restrictions on public health personnel in proportion to the magnitude of the program, and to characteristic defects and restrictions of CWA and ERA program conditions primarily governed by the furnishing of minimum aid to relief cases. In spite of deficiencies, the program is endorsed and praised as having provided great benefit to numerous individual areas.

Detailed description of the duties and functions of field personnel on malaria drainage is given. Detailed description of program and project difficulties involved in the operation of work relief labor is given. Labor forces employed were almost exclusively provided by relief agencies, although this state has a prior history of malaria drainage by convicts. Work was accomplished in 110 counties, 2,500 ponds were drained, and 6,000,000 man hours of employment were devoted to the program.

The second section deals with malaria prevalence and epidemiological factors. This discussion recognizes rainfall as the principal determinant of malaria prevalence. The "Number of deaths

per inch of rainfall" is computed for comparative purposes in the study of other epidemiological factors, and in evaluating state-wide effectiveness of control. Little consideration is given to total malaria deaths in the state, which it is demonstrated will fluctuate very widely in crude relation to the rainfall, irrespective of all other factors.

A normal expectancy of 8.62 deaths from malaria per inch of rainfall is established by records over a 15 year period. Death rates in excess of this normal expectancy furnish indications of variation in disease virulency, type of disease, changes in the human host, and in the failure of control measures. Rates below the normal occurrence are counter indicative.

The effectiveness of drainage in influencing the state-wide problem as well as restricted local conditions is demonstrated by a declining trend curve, and also by rate curve characteristics for 1934 which show a below normal occurrence in spite of an expected 7 year cyclic increase and by nation-wide statistics of the U. S. Public Health Service.

Secondary curves published show a lag in the up-turn of malaria deaths with increasing rainfall after the end of drought periods (see 1926 and 1932). This is attributed to the accumulated deficiency of pond storage waters, requiring extensive replenishing before marked expansion in anopheles breeding occurs, and to the reduction of carriers. Sustained increase in precipitation resulted in the accelerated increases of malaria deaths occurring immediately after the period of lag.

The relative value of malaria morbidity and mortality reporting is discussed.

Malaria control by mass drug treatment, and thick blood smear surveys are under way in the state, but are not discussed in the engineering report.

JOHN M. HENDERSON

Methods and Materials of Health Education—By *Jesse Feiring Williams, M.D., and Fannie B. Shaw, M.A.* New York: Nelson, 1935. 331 pp. Price, \$1.65.

This book runs the gamut of school health education, discussing such erudite subjects as environmental sanitation, or "healthful school living," health service, and health instruction. In addition, there are chapters on the nature of the child, the construction of the curriculum, tests and measurements in health education, materials for teaching health, and the rôle of various organizations in the now highly developed art and science of health education. As a fitting climax, the health of the teacher receives ardent attention.

Although somewhat pedantic in tone, this well printed book is a valuable contribution to the literature on an important branch of public health. It should prove of practical value to all persons engaged in school health education and deserves wide use for that significant purpose. JAMES A. TOBEY

Bacteriology for Nurses—By *M. A. Smeeton, B.Sc., M.A. (4th ed.)* New York: Macmillan, 1935. 352 pp. Price, \$2.50.

This is the fourth edition of a concise and comprehensive text. In this revision of the book current nomenclature has been introduced; and new subject matter incorporated which is in accord with the results of recent research.

The classification of Prevalent Communicable Diseases, added to Chapter X, furnished a useful summary of information as to the infective agent, source of infection, and period of infectivity. However, the methods of control—as listed in this classification are too brief and generalized to provide much information for the student.

One of the weakest features of the

book is the lack of a bibliography or list of reference readings.

The illustrations are greatly improved, clearly labeled, and well chosen.

Appendix I, dealing with the classification of bacteria is an especially good feature of the book and serves to make more complete a very acceptable text in bacteriology for nurses.

MARY C. EDGAR

Introduction to Psychology. With Special Applications to Nursing and Nursing Interrelationships, 1910-1913—By *Edward S. Robinson and Virginia Kirk.* New York: Macmillan, 1935. 368 pp. Price, \$2.50.

This is no ordinary book on psychology. It contains special applications to nursing and nursing problems.

Praise be, too, it doesn't plunge one immediately, like some of the older texts on the subject, into the intricate anatomy of the nervous system. It is practical and actually interesting.

In the chapter on memory we begin to understand these wordy individuals who dwell on all the inconsequential details when telling a story. The trouble with them is that they do not distinguish between what is significant and what is not, and lose the point of the story; as the author states "they get just as excited over a broken chair as they would over a broken leg."

The material is beautifully arranged, with good paragraph headings and plenty of illustrations. Each chapter is summarized and ends up with a set of problems that are real nut crackers—also with good references for further study.

Nurses are feeling more and more the need to study mental hygiene. A text like this is an essential preliminary to that study. And with the growing emphasis on more university education for nurses—here is a book of real college caliber for them.

EVA F. MACDOUGALL

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

About Alcohol and Tobacco—Why do people smoke and drink? What probable harm do these poisons do? These questions are not answered, but the attempt to do so reaches the usual standard of the unusual magazine which studied the question.

ANON. Alcohol and Tobacco. *Fortune*, 12, 3:67 (Sept.), 1935.

Scarlet Fever among Nurses—In a large group of nurses, the attack rate among those persons susceptible to scarlet fever was 12.8 per cent, whereas among the Dick negative and the immunized groups the attack rate was 0.7 per cent.

ANDERSON, G. W., and REINHARDT, W. I. Scarlet Fever Immunization of Nurses. *J. Infect. Dis.* 57, 2:136 (Sept.-Oct.), 1935.

A Britton Looks at Food Standardization—Calling for a committee to set up standards for certain food products, the author warns against the possibility of raising the price of the standardized foods above the pocketbooks of the poor. He would rather see the poor have plenty of wholesome but so-called second-class foods than too little first-class articles which, while excellent esthetically, would not be nutritionally superior.

BROWN, R. K. Standardization of Food. *J. State Med.* 43, 9:513 (Sept.), 1935.

Heart Disease Causes—Rheumatism was the commonest cause of heart disease, exclusive of the arteriosclerotic-hypertensive types, and syphilis next among the heart disease deaths under review.

HEDLEY, O. F. A Study of 450 Fatal Cases of Heart Disease Occurring in Washington (D. C.) Hospitals during 1932 with Special Reference to Etiology, Race and Sex. *Pub. Health Rep.* 50, 34:1127 (Aug. 23), 1935.

Convalescent Serum against Scarlet Fever—Immune scarlet fever serum will prevent infection in contacts in 95 per cent of the cases; where protection is not complete the disease is modified; it will abort the disease if given early; even if late, it seemed beneficial; no ill effects were experienced.

HOYNE, A. L., *et al.* Convalescent Scarlet Fever Serum. *J.A.M.A.* 105, 10:783 (Sept. 7), 1935.

For the Prevention of Measles—Convalescent serum is still the best prophylactic agent against measles, in the author's opinion. Adult blood is effective, as is placental globulin, though the reaction to the latter may be severe.

KARELITZ, S. Measles Prophylaxis. *New York State J. Med.* 35, 17:876 (Sept. 1), 1935.

Plague in the West—Plague, concludes this article, is a permanent problem on the Pacific Coast and probably will appear in other states. Especially to be feared is the pneumonic form which may be related to the disease in squirrels, ground hogs, and related species.

KELLOGG, W. H. Rodent Plague of California. *J.A.M.A.* 105, 11:856 (Sept. 14), 1935.

Preventing Pertussis—Convalescent serum was found of prophylactic value in whooping cough but of doubtful benefit in treatment. A useful skin test is proposed.

PATERSON, D., *et al.* Control of Whooping Cough with Serum and Vaccine. *Lancet*, 2, 7:361 (Aug. 17), 1935.

Nursing and V. D. Control—Stressing the importance of case find-

ing and follow-up in the control of gonorrhea and syphilis, the author develops the great possibilities of public health nursing contributions to the cause.

NELSON, N. A. *The Prevention and Control of Gonorrhea and Syphilis*. Pub. Health Nurs. 27, 9:463 (Sept.), 1935.

Industrial Hygiene High Spots—Typically British is this philosophical discussion of the health of industrial workers. Most American papers would be more readable were they written with the broader vision of our overseas cousins.

OLIVER, T. *Side Lights upon the Health of Workers and Their Occupations*. J. State Med. 43, 9:497 (Sept.), 1935.

Psychology and the Nursling—That you can lead a baby to milk but you can't make him drink seems to be one of the arresting ideas in this stimulating paper on infant nutrition, which ought to be taken to heart by all who have to do with babies.

POWERS, G. F. *Infant Feeding*. J.A.M.A. 105, 10:754 (Sept. 7), 1935.

In the Baby's Bottle—Buffered lactic acid milk is good for new-born infants. They should experience less initial loss of weight and do better afterward. It is good for premature and debilitated infants, too.

SMYTH, F. S., and HURWITZ, S. *Buffered Lactic Acid Evaporated Milk in Infant Feeding*. J.A.M.A. 105, 10:789 (Sept. 7), 1935.

More about Dr. Topley's Famous Mice—Under experimental conditions, the long continued daily addition of susceptible mice to an infected herd finally reaches a state of epidemic equilibrium in which deaths are constant. Periodicities in natural epidemics must be due to variations in factors kept constant in the experimental environment. Adding immunized entrants lowered the death rate to mouse typhoid, but did not wipe out the epidemic. Conclusions regarding relationships in the diseases of mice and men are stimulating.

TOPLEY, W. W. C. *Some Aspects of Herd Immunity*. J. Roy. San. Inst. 41, 3:123 (Sept.), 1935.

BOOKS RECEIVED

FREE MEDICAL CARE (SOCIALIZED MEDICINE). By E. C. Buehler. New York: Noble & Noble, 1935. 360 pp. Price, \$2.00.

HEALTH STORIES. Book III. By Anna B. Towse, Florence E. Mathews and William S. Gray. Chicago: Scott, Foresman & Co., 1935. 208 pp. Price, \$76.

NATIONAL PUBLIC WORKS. Addendum. Geneva: League of Nations, 1935. 226 pp. Price, \$2.00.

ABNORMAL ARTERIAL TENSION. By Edward J. Stieglitz. New York: National Medical Book Co., 1935. 261 pp. Price, \$3.00.

DISEASES OF THE CHEST. By J. Arthur Myers. New York: National Medical Book Co., 1935. 385 pp. Price, \$3.00.

COMMONER DISEASES OF THE SKIN. By S. William Becker. New York: National Medical Book Co., 1935. 283 pp. Price, \$3.00.

PEDIATRIC TREATMENT. By Philip S. Potter. New York: Macmillan, 1935. 578 pp. Price, \$5.00.

INDUSTRIAL MEDICINE. By W. Irving Clark and Philip Drinker. New York: National Medical Book Co., 1935. 262 pp. Price, \$3.00.

THE PATIENT'S DILEMMA. By S. A. Tannenbaum and Paul Maerker Branden. New York: Coward-McCann, 1935. 278 pp. Price, \$2.50.

THE STORY OF MEDICINE IN THE MIDDLE AGES. By David Riesman, M.D. New York: Hoeber, 1935. 402 pp. Price, \$5.00.

AGENTS OF DISEASE AND HOST RESISTANCE: INCLUDING THE PRINCIPLES OF IMMUNOLOGY, BACTERIOLOGY, MYCOLOGY, PROTOZOÖLOGY, PARASITOLOGY AND VIRUS DISEASES. By Frederick P. Gay and Associates. Springfield, Ill., and Baltimore, Md.: Charles C. Thomas, 1935. 1,582 pp. Price, \$10.00.

SURVEY REPORT OF THE CINCINNATI PUBLIC SCHOOLS. By the United States Office of Education. Copies available from the Board of Education, Cincinnati, Ohio, at \$1.50 (plus postage).

ASSOCIATION NEWS

OFFICERS, 1935-1936

President, Walter H. Brown, M.D., Palo Alto, Calif.

President-elect, Thomas Parran, Jr., M.D., Albany, N. Y.

First Vice-President, Robert E. Wodehouse, M.D., Ottawa, Ont., Can.

Second Vice-President, Prof. Samuel C. Prescott, Cambridge, Mass.

Third Vice-President, Angel de la Garza Brito, M.D., Mexico City, Mex.

Treasurer, Louis I. Dublin, Ph.D., New York, N. Y.

Executive Secretary, Reginald M. Atwater, M.D., New York, N. Y.

Chairman of Executive Board, John A. Ferrell, M.D., New York, N. Y.

THE NEXT ANNUAL MEETING WILL BE HELD IN NEW ORLEANS, LA.

WALTER H. BROWN, M.D., PRESIDENT

THOMAS PARRAN, JR., M.D., PRESIDENT-ELECT

AT the Sixty-fourth Annual Meeting in Milwaukee, Wis., Eugene L. Bishop, M.D., retired from the office of President of the American Public Health Association and Walter H.

Brown, M.D., of Stanford University, Palo Alto, Calif., became President to serve for the year 1935-1936. Dr. Brown is well known in Association circles, having served in numerous



Walter H. Brown, M.D.



Thomas Parran, Jr., M.D.

capacities—most recently as President of the Western Branch of the A.P.H.A. Dr. Brown is a graduate of Jefferson Medical College, Philadelphia, and practised medicine in Pennsylvania for several years prior to his graduation from the Harvard-M.I.T. School for Health Officers in 1914. He served as Epidemiologist of the Massachusetts State Department of Public Health; as Health Officer of Bridgeport, Conn.; as Associate Director of Health Service of the American Red Cross; and was assigned to the Commission for Prevention of Tuberculosis in France by the Rockefeller Foundation at the close of the war. Later Dr. Brown became the Director of the Child Health Demonstration in Mansfield, Ohio, and subsequently was Director of the Child Health Demonstration in Marion County, Ore. Since 1927, Dr. Brown has been Professor of Hygiene at Leland Stanford University. He has been a member of the A.P.H.A. since 1915 and a Fellow since 1922.

The new President-Elect is Thomas Parran, Jr., M.D., Commissioner of Health of New York State. Dr. Parran, who is a graduate in medicine

of Georgetown University, has been identified with the U. S. Public Health Service since 1917. Among various assignments he has served as Chief Medical Officer of Muscle Shoals, Ala.; Executive Officer of the Medical Division of the War Risk Insurance Bureau; Director of the Tri-State Sanitary District; Director of Rural Sanitation in the Missouri State Department of Health, and in a similar capacity in Illinois. In 1925, Dr. Parran was made Chief of the Division of Venereal Diseases in the Public Health Service with the rank of Assistant Surgeon General, where he served until his appointment in 1930 by Franklin D. Roosevelt, then Governor, as Commissioner of Health in New York State. Dr. Parran is a member of the Committee on Research in Syphilis. He has served as Treasurer of the Association for 2 years, and since 1933 has been Chairman of the Executive Board, which brings to him a valuable familiarity with the current affairs of the Association.

Dr. Parran has been a member of the A.P.H.A. since 1919, and a Fellow since 1923.

THE SEDGWICK MEMORIAL MEDAL

AT the Milwaukee meeting the Sedgwick Memorial Medal for distinguished service in public health was awarded to Haven Emerson, M.D., of the College of Physicians and Surgeons, Columbia University, New York.

Dr. Emerson is well known to the Association, having served as President 1933-1934. He is a graduate of the College of Physicians and Surgeons in New York, class of 1899. He was Commissioner of Health of New York City 1915-1917 and has had teaching connections with Cornell University and the New York School of Social

Work besides his present connection as Professor of Public Health Administration at Columbia, where he has been since 1922. Dr. Emerson was a Colonel in the U. S. Army during the World War and is now a member of the National Advisory Health Council of the U. S. Public Health Service.

Among other awards which Dr. Emerson has received have been the Distinguished Service Medal, the *Medaille des Epidemies*, and the *Chevalier Legion d'Honneur* (France). The Sedgwick Memorial Medal was presented by William H. Park, M.D., of New York, himself a recipient of the

medal in 1932. Dr. Park paid a fitting tribute to the memory of Professor Sedgwick, and spoke of the eminent qualifications of Dr. Emerson for this honor.

Replying to the presentation, Dr. Emerson said:

"In accepting this token from your hands, Dr. Park, I recognize the occasion as one when friends and disciples delight to do honor to the memory of a great teacher.

"Someone, each year, is chosen to serve as a sort of proxy, and I appreciate the temporary privilege of playing a part in reenacting the annual tribute of admiration for the character and life work of William Thompson Sedgwick.

"He most happily personified that rare but indispensable individual, whom Matthew Arnold so handsomely described:

The great men of culture are those who have had a passion for diffusing, for making prevail, for carrying from one end of society to the other the best knowledge, the best ideas of their time; who have labored to divest knowledge of all that was harsh,

uncouth, difficult, abstract, professional, exclusive; to humanize it, to make it outside the clique of the cultivated and the learned, yet still remaining the best knowledge and thought of the time.

"Professor Sedgwick was such a great man of culture.

"This precious golden disk I shall keep before me, in the hope that by good fortune and hard work I may do something for the students of today, which will make them as useful in our society as are everywhere the students of Sedgwick."

Previous recipients of the Sedgwick Memorial Medal were:

- 1929 Charles V. Chapin, M.D.
- 1930 Theobald Smith, M.D.
- 1931 George W. McCoy, M.D.
- 1932 William H. Park, M.D.
- 1933 Milton J. Rosenau, M.D.
- 1934 Prof. Edwin O. Jordan

The Chairman of the Committee on Award of the Medal for 1935 was Surgeon-General Hugh S. Cumming, of Washington. Beginning in 1936, the Committee of Award will consist of the five most recent recipients of the Medal.

LEGITIMACY RECORDS ON BIRTH CERTIFICATES

AT the Milwaukee Annual Meeting the Section on Vital Statistics passed unanimously a resolution looking toward the removal from all birth records of statements of legitimacy. It was stated that about 50,000 babies are acknowledged as born out of wedlock each year in the United States and that the true number was closer to 100,000. These birth records are recognized as being no better than casual statements of purported fact, and are of course subject to the usual tests of evidence. The stigma involved for the child is so great that the social usefulness of these reports is open to serious question.

"In pursuance of the recommendation of the Committee, the Vital Sta-

tistics section unanimously resolved that the committee should take steps leading toward the elimination from official birth records of all references to legitimacy of the child.

"It was the further sense of the section that the future work of the committee should be guided by the concept that no child in America should be denied the equality and the complete freedom to pursue happiness, which, in the words of the Declaration of Independence, are the inalienable rights of all men."

The Chairman of this committee, J. V. DePorte, M.D., of the New York State Department of Health, said:

"At present a child born out of wedlock is stigmatized for life. In

recent years the injustice of penalizing a child whose parents were not married has come to be recognized; hence the increasing acceptance of the viewpoint that there may be illegitimate parents, but there can be no illegitimate children."

Thomas Parran, Jr., M.D., New York State Health Commissioner, endorsed this action of the section and stated that plans have been made to make effective this recommendation

through legislative action in New York State sponsored by Governor Lehman.

This Section action was considered by the Governing Council of the American Public Health Association and approved for publication as representing the attitude of the Association. It has received wide newspaper attention and the section officers have suggested that the time may now be ripe in many states for definitive action.

CHANGES IN THE BY-LAWS MADE AT THE ANNUAL MEETING

ON the recommendation of the Association Committee on Constitution and By-Laws, composed of Henry F. Vaughan, Dr.P.H., *Chairman*; Haven Emerson, M.D., and John A. Ferrell, M.D., the Governing Council at Milwaukee adopted two changes in the By-Laws which will be of interest to the membership.

Having in mind the desire to broaden the group of persons who carry important Association responsibilities, it was decided that hereafter those Fellows who were elected to and who accepted membership upon the Executive Board should be ineligible for membership on any of the Standing Committees of the Association. This provision will serve an additional purpose of making the Executive Board a more judicial agency in passing upon the budgetary requests of Standing Committees than would be possible were the members of the Standing Committees members also of the Executive Board. The new By-Law provides that those members of the Executive Board who were serving at the close of the Milwaukee session would have their choice of continuing with the Executive Board or continuing with the Standing Committee.

The new Executive Board, which

consists of the President, the President-elect, the Treasurer, and 6 other Fellows of the Association, includes 3 new members, Dr. J. N. Baker of Alabama, Dr. John P. Koehler of Milwaukee, Friend Lee Mickle of Connecticut, in addition to Dr. John L. Rice of New York, and Dr. Huntington Williams of Baltimore who were reelected. Dr. John A. Ferrell of New York has been elected Chairman of the Executive Board for one year. The vacancies on Standing Committees occasioned by this new By-Law will be filled at the December meeting of the Executive Board on recommendations submitted by the Chairmen of the Standing Committees.

Another important change in the By-Laws was made at the instance of the Committee on Fellowship and Membership as a result of a special study made of the grades of membership. In effect, this change does away with the former distinctions between active and associate members, creating instead a grade known as "member." Constituents from any country may be elected to this and to other classes of membership except that of "Fellow." Fellows must be professional health workers from the United States and its possessions, Canada, Mexico, and Cuba.

The former provisions of the By-Laws regarding members and associate members had attempted to distinguish between these two classes on a basis which did not prove practical in operation. A good many persons classified in one way at the time of entering the Association are now eligible for another class, and considerable confusion has arisen over this arbitrary distinction. At the same time that general membership is broadened, an effort will be made by the Committee on Fellowship and Membership to tighten up the requirements in the higher grade of Fellowship.

The Governing Council considered a

revision of the procedure for the nominations to the Governing Council, desiring that the representation on the Governing Council in the future might be more democratic and better distributed geographically. After much discussion, it was decided to leave this proposal on the table in such a form that it may be raised for action at the next Annual Meeting if, in the opinion of those interested, it would accomplish its purpose. There appeared to be no difference of opinion on the need for a better method, but there was a question in the minds of a good many members of the Council whether the ideal scheme had yet been found.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

T. F. Abercrombie, M.D., State Department of Health, Atlanta, Ga., State Director of Health
 Robert K. Galloway, M.D., M.P.H., Franklin, Tenn., Director, Williamson County Health Department
 Walter H. Hartung, M.D., State Office Building, Columbus, O., State Director of Health
 Bernard Hochfelder, M.D., Coushatta, La., Director, Red River Parish Health Unit
 Ferdinand R. Krembs, M.D., Stevens Point, Wis., Health Officer
 J. W. Lowe, M.D., Merrilan, Wis., Health Officer
 William J. Lutz, Route 9, Box 164, Milwaukee, Wis., Health Officer
 Charles H. Mason, M.D., 1302 Tower Avenue, Superior, Wis., Health Officer
 John A. McDonald, M.D., Eastport, Me., Washington County District Health Officer
 John C. McGuire, M.D., Hazlehurst, Miss., County Health Officer
 Michael J. Nester, M.D., 710 North Main Street, Providence, R. I., Superintendent of Health
 John Oberwager, M.D., 1327 Lexington Avenue, New York, N. Y., Sanitary Superintendent, New York City Department of Health
 Dr. Gral. Jose Siurob, Avenue Mariano Escobedo #59, Tacuba, Mexico, D. F.,

Mex., Head of Federal Health Department
 G. Colbert Tyler, M.D., City Hall, Newport News, Va., Health Officer
 Richard W. Weiser, M.D., 139 E. Hazeltine Avenue, Kenmore, N. Y., Medical Supervisor, City Public Schools
 Harry F. Wilson, M.D., C.P.H., Dillon, S. C., County Health Officer
 Dr. F. T. Younker, Galesville, Wis., Health Officer

Laboratory Section

Irving H. Borts, M.D., 817-7th Avenue, Iowa City, Ia., Bacteriologist, State Laboratory
 Frank W. Bouska, M.S., 1526 South State St., Chicago, Ill., Superintendent, Beatrice Creamery Company
 Cornelia L. Carey, Ph.D., Barnard College, New York, N. Y., Assistant Professor
 Gail M. Dack, M.D., Ph.D., 5724 Ellis Avenue, Chicago, Ill., Assistant Professor, Department of Hygiene and Bacteriology, University of Chicago
 Earl W. Flosdorf, Ph.D., 36 South Wyoming Avenue, Ardmore, Pa., Associate, Department of Bacteriology, School of Medicine, University of Pennsylvania
 Paul S. Galtsoff, Ph.D., U. S. Bureau of Fisheries, Washington, D. C., Charge of Oyster Fishery Investigations
 Lucy Heathman, M.D., Ph.D., State Depart-

ment of Health, Minneapolis, Minn., Assistant Director, Preventable Diseases Division

Betty S. Kolchin, 3 Research Laboratory, Ft. of East 15 Street, New York, N. Y., Bacteriologist

George F. Leonard, M.D., E. R. Squibb & Sons, New Brunswick, N. J., Bacteriologist and Immunologist

Charles S. McCleskey, Ph.D., Iowa State College, Ames, Ia., Bacteriology Teacher

Wayne N. Plastring, Ph.D., Storrs Agricultural Experiment Station, Storrs, Conn., Associate Bacteriologist

George E. Rockwell, R. F. D., Milford, Ohio, Associate Professor of Bacteriology, Medical College

Wilbert S. Slemmons, M.S., Oconomowoc, Wis., with Carnation Company

Gustav I. Steffen, Ph.D., 525 East 68 Street, New York, N. Y., Assistant Bacteriologist, New York Hospital

R. W. Titus, Ph.D., Marysville, O., Director of Research, Nestle's Milk Products, Inc.

John A. Toomey, M.D., City Hospital, Cleveland, Ohio, Physician in Charge

Oscar B. Williams, Ph.D., 1739 H Street, N.W., Washington, D. C., Bacteriologist, National Canners Assn., Research Laboratory

Vital Statistics Section

J. F. Blackerby, 532 W. Main Street, Louisville, Ky., State Registrar of Vital Statistics

Franklin H. Reeder, Jr., 410½ Nancy Street, Charleston, W. Va., Acting State Registrar of Vital Statistics

Public Health Engineering Section

Harold S. Adams, B.S., 213 North Sycamore Street, Marshall, Mich., Sanitary Engineer, Calhoun County Health Department

O. T. Birkeness, 605 W. Washington Street, Chicago, Ill., Sanitary Engineer, Wallace & Tiernan Company

Earl Devendorf, B.S., 1228 State Street, Schenectady, N. Y., Associate Director, Division of Sanitation, State Department of Health

Arthur B. Fergusson, 24 N. Sheppard Street, Richmond, Va., Chief Sanitary Officer

Ed L. Penfrase, 101 Park Avenue, New York, N. Y., Research work in Public Health Engineering

Robert R. Stewart, State Board of Health, Jefferson City, Mo., Engineer

Charles P. Tracy, 1118 Stewart Ave., Knoxville, Tenn., Director of Sanitation, City Health Department.

Industrial Hygiene Section

William H. Lehmberg, S.B., American Optical Company, Southbridge, Mass., Research and Development work on respiratory protective devices and dust quantitation instruments

Edward G. Meiter, Ph.D., Employers Mutuals, Milwaukee, Wis., Director, Industrial Hygiene Laboratory

Heymen R. Miller, M.D., 2 East 85 Street, New York, N. Y., Practice and consultation in Industrial Medicine

Food and Nutrition Section

Morris Ant, M.D., 277 Eastern Parkway, Brooklyn, N. Y., Physician

Henry Hoffmann, Jr., Rm. 552, State Office Bldg., St. Paul, Minn., Chief Chemist, Department of Agriculture

George H. Marsh, M.S., Department of Agriculture & Industries, Montgomery, Ala., Supervisor, Food and Drug Control

Morris Ostrolenk, B.S., U. S. Department of Agriculture, Food & Drug Administration, Washington, D. C., Bacteriologist

Child Hygiene Section

Elizabeth Andruszkiewicz, M.D., 2063 South 13 Street, Milwaukee, Wis., Child Welfare Physician

Frances A. Cline, M.D., State Board of Health, Madison, Wis., Staff Physician, Bureau of Child Welfare

A. Winnifred Golley, R.N., Box 94, Charlevoix, Mich., County Nurse, Children's Fund of Michigan

Reverdy M. Hall, M.D., 324 East Wisconsin Avenue, Milwaukee, Wis., Pediatrician, Milwaukee County Day Schools

Edythe P. Hershey, M.D., School Administration Building, Dallas, Tex., Director, School Health

Katharine F. Lenroot, B.A., Chief, Children's Bureau, Department of Labor, Washington, D. C.

Albert McCown, M.D., Children's Bureau, Department of Labor, Washington, D. C., Acting Director, Division of Maternal & Child Health

Mac C. Schroder, M.D., Bureau of Laboratories, Ft. of East 16 Street, New York, N. Y., Research Worker

Lendon Snedeker, M.D., M.P.H., 66 Commonwealth Avenue, Boston, Mass., Practising Pediatrics

Irene T. Stemper, 209 Woodland Lane, Oconomowoc, Wis., Examining Physician, Waukesha County Child Health Center

Nina Tomkiewicz, M.D., 920 North 15 St., Milwaukee, Wis., Child Welfare Clinic Physician

Public Health Education Section

Francis L. Bacon, LL.D., Evanston Township High School, Evanston, Ill., Principal
 Ruth L. Conrad, M.A., 1077 New York Avenue, Pasadena, Calif., Instructor, Bacteriology, Pasadena Junior College
 Elizabeth Dean, B.S., 6 Payne Place, Normal, Ill., Assistant Professor of Hygiene and Health Education, Normal University
 Walter F. Greenman, 320 Otis Street, West Newton, Mass., Member, Executive Committee, Massachusetts Tuberculosis League
 Alvin Powell, M.D., Lafayette, Calif., University of California, Dept. of Education

Public Health Nursing Section

Norma B. Eskil, R.N., 308 South Wilson Street, Royal Oak, Mich., Visiting Nurse, Detroit Visiting Nurse Association
 Eluore Hackmann, R.N., Marshfield, Mo., Webster County Public Health Nurse
 Hazel Hutcheson, Court House, Fargo, N. D., Supervisor, County Public Health Nursing
 Lulu J. Koepke, Benzon, Ariz., U. S. Public Health Service
 Lucille Morgan, R.N., 310 Grover Street, Warrensburg, Mo., Nurse, Central Missouri State Teachers College
 Margaret B. Purvis, B.S., 38 East Highland Avenue, Atlantic Highlands, N. J., Superintendent of Nursing Education, New York City Department of Health

Cecile O. Sparkman, Lewisburg Avenue, Franklin, Tenn., Williamson County Nurse
 Elsie B. Thomson, 145-95 Street, Brooklyn, N. Y., Supervising Nurse, New York City Department of Health
 Ethelyn Town, R.N., Jefferson, Wis., Jefferson County Nurse
 Esther C. Treadway, R.N., 2001 Warren Street, Winfield, Kans., City School Nurse
 Jane White, R.N., 820 Bush Street, Jackson, Mich., Supervisor, Public Health Nurses
 Edna L. Whitesides, P. O. Box 235, Columbia, Mo., Metropolitan Life Ins. Co. Nurse
 Ruth I. Wisnaes, R.N., 704-7 Street, Bismarck, N. D., State Supervisor Nursing Service, F.E.R.A.

Epidemiology Section

Floyd C. Turner, M.D., National Institute of Health, Washington, D. C., Surgeon, U. S. Public Health Service

Unaffiliated

Charles H. Eastwood, Wallace & Tiernan Co., Newark, N. J., Advertising Manager
 Dwight O'Hara, 5 Bay State Road, Boston, Mass., Professor of Preventive Medicine, Tufts College, Medical School
 George R. Wilkes, 3308 School Lane, Drexel Hill, Pa., Biological Department, The National Drug Company

HONORARY FELLOW ELECTED

AT the Milwaukee Annual Meeting, Dr. Gustavo Pittaluga, of Madrid, Spain, was elected to Honorary Fellowship in the American Public Health Association.

Dr. Pittaluga is Director of the Instituto Nacional de Sanidad, Chief of the Spanish Public Health Service, and Professor of Tropical Medicine and Hygiene in the University of Madrid Medical School.

SOUTHERN BRANCH, A.P.H.A.

THE meeting of the Southern Branch of the American Public Health Association, to be held at the Jefferson Hotel, St. Louis, Mo., November 19-20, will include a symposium on poliomyelitis.

AT THE MILWAUKEE MEETING

Dr. J. Offringa, the Director of the Public Health Service in Batavia, Dutch East Indies, was among the overseas visitors at the Milwaukee meeting.

Another distinguished visitor from abroad was Dr. Einar Rietz, the Health Officer of Stockholm, Sweden. Dr. Rietz presented a paper at the dinner of the Health Officers Section on the control of syphilis.

Dr. Angel de la Garza Brito, Supervisor General of the Departamento de Salubridad, Mexico, in attendance at Milwaukee was the official representative of the Federal Department of Health of which Dr. Gral. Jose Siurob is Director General. Dr. Brito was elected a Vice-President of the Association.

NEWS FROM THE FIELD

COMMISSION TO CODIFY HEALTH LAWS

A PUBLIC HEALTH commission to codify the health laws of the State of Massachusetts, eliminating those which are obsolete and revising others, was appointed by Governor Curley, August 21.

Henry D. Chadwick, M.D., State Commissioner of Public Health, member A.P.H.A., is Chairman of the Commission; Wilson G. Smillie, M.D., Professor of Public Health Administration, Harvard School of Public Health, Fellow A.P.H.A., is Vice-chairman; and Charles F. Wilinsky, M.D., Deputy Health Commissioner of Boston, F.A.P.H.A., is Secretary.

In addition to the codification of health laws, the Commission also will consider minimum standards for local health officers, the organization of county health districts, making a study of industrial hygiene, the licensing of hospitals, and milk control practices.

EIGHT HOURS FOR NURSES

UNDER the auspices of the Committee on Eight Hours for Nurses, District 13 of the New York State Nurses Association, there will be a Nurses Hobby Show, at the Hotel Biltmore, New York, on November 14-15.

The objectives are:

1. To present the hobbies of nurses and demonstrate the versatility of members of the profession.

2. To make available opportunities and resources for hobbies in New York City.

3. To stimulate widespread interest in the Hobby Show among doctors, hospital authorities, and the general public to the end that there will be more general recognition of the fact that nurses need leisure; that shortened hours of work will give them added zest and time for broadening interests which will reflect advantageously in their care of the sick.

INTEREST IN INFLUENZA

DR. RUFUS COLE, of the Hospital of the Rockefeller Institute for Medical Research, New York, has requested that state health officers notify him at the Institute of any fresh outbreaks of influenza which may occur.

There have been isolated in some recent outbreaks organisms which may stand in causal relationship to this disease and Dr. Cole wishes this advance information in order that further studies can be made.

COURSE IN PUBLIC HEALTH TEACHING

A FOUR-YEAR integrated curriculum in public health teaching has been established at George Washington University School of Medicine, Washington, D. C., to parallel its curriculum in mental health established 3 years ago under Dr. William A. White.

The public health course has been made a part of the regular medical course for the degree of doctor of medicine but is open also to special and graduate students in the public health field. Courses in community health, sanitation, hygiene, preventive medicine, and the public health aspects of medicine and surgery are included. —*J.A.M.A.*, Sept. 28, 1935, p. 1044.

CRIPPLED CHILDREN REHABILITATION PROGRAM IN SOUTH CAROLINA

THE South Carolina Society for Crippled Children and the South Carolina State Department of Health have launched a state-wide program for rehabilitation, with district headquarters in Greenville, Columbia, Florence, and Charleston.

Clinics will be held weekly in these cities and in Spartanburg.

A committee consisting of Dr. Lesesne Smith, of Spartanburg, Dr. Julian P. Price, of Florence, and P. G. Sherer, Chief of the Division of Vocational Rehabilitation in the State Department of Education, is in charge of the program, which is financed by funds raised by the society and by money available to the State Health Department for orthopedic work.

MASSACHUSETTS HEALTH SURVEY

THE share of Massachusetts in the \$3,450,000 appropriation for a nation-wide public health survey will be \$162,000. A house-to-house canvass will be made to determine the prevalence of chronic diseases.

Sample groups of certain income levels will be studied in this national survey, sponsored by the U. S. Public Health Service and carried out by the Works Progress Administration. Medical facilities for the care of the sick will be studied.

NEBRASKA HEALTH SERVICE CREATED

THE Omaha-Douglas County Central Health Service was incorporated August 1.

The new organization aims to enable persons of low income to obtain medical service at a cost within their financial means, establish a friendly doctor-patient relationship, aid the physician in the collection of fees, and prevent those persons from receiving free clinic care who can afford to pay for medical service.

The incorporators of the new service are Dr. Frederick O. Beck, Dr. E. H. Bruening, and Dr. John Jay Keegan, all of Omaha. The headquarters will be in Omaha, Neb.—*J.A.M.A.*, Sept. 14, 1935.

MINNESOTA HEALTH SURVEY

OF the \$3,450,000 federal allocation for a national public health survey, Minnesota will receive \$108,-

500 to carry out its studies, it is reported.

A house-to-house canvass will be made to determine the prevalence of chronic diseases; physical examinations will be given; and studies of medical facilities will be carried out.

BROSS PRIZE

A PRIZE of \$15,000 will be awarded under the Bross Foundation, established at Lake Forest College, Lake Forest, Ill., in 1879, by William Bross in memory of his son Nathaniel.

Known as the Bross Prize, the award will be given for the best book or manuscript heretofore unpublished on the connection, relation, and mutual bearing of the humanities, the social sciences, the physical sciences, the biological sciences, or any branch of knowledge with and on the Christian religion. The award will be made on January 1, 1940.

William Bross was a former (1865-1869) Lieutenant-Governor of Illinois and a Trustee of Lake Forest College for 26 years. With J. L. Scripps, Joseph Medill, Alfred Cowles, and others, he was founder of the *Chicago Tribune*.

In 1925 the prize went to Douglas C. MacIntosh, Yale University Professor. Other winners have included a Scotsman and an Englishman. Distinguished men who have lectured at Lake Forest College under the Bross Foundation have included Professor Marcus Dods of New College, Edinburgh, Scotland; Professor J. Arthur Thomson of the University of Aberdeen, Scotland; Dr. Frederick J. Bliss of Beirut, Syria; Reverend John N. Figgis of Mirfield, England; Professor Henry W. Wright of the University of Manitoba, Canada; Dr. M. Bross Thomas of Lake Forest.

"The offer must be open to scientific men, the Christian philosophers and historians of all nations."

Those entering the competition may have until September 1, 1939. They are to submit their manuscripts of a minimum of 50,000 words.

NEW MEXICO DISTRICT HEALTH OFFICERS

HEALTH work in New Mexico has been organized into 10 districts, each under the supervision of a full-time health officer.

Nine health officers have already been appointed, with headquarters as follows:

Elroy F. McIntyre, M.D.,* Santa Fe
 Edgar B. Beaver, Gallup
 James R. Scott, Ph.D.,† Albuquerque
 Charles W. Gerber,† Las Cruces
 William W. Johnston, M.D.,† Las Vegas
 Owen E. Puckett, M.D.,* Carlsbad
 Frank W. Parker, Jr., Silver City
 Julian O. Long, Los Lunas
 Leonard A. Dewey, Clovis (temporary)

* Member, A.P.H.A.

† Fellow, A.P.H.A.

CHANGES IN PUBLIC HEALTH SERVICE

IT has been announced that the following members of the U. S. Public Health Service have been promoted and commissioned as medical directors in the regular corps of the service:

James P. Leake, M.D., F.A.P.H.A.
 Lawrence Kolb
 H. E. Hasseltine, M.D., F.A.P.H.A.

Dr. Hasseltine was recently relieved of his duties at San Francisco, Calif., and assigned to Carville, La., in charge of the U. S. Marine Hospital.—*J.A.M.A.*, Sept. 28, 1935, p. 1047.

PUERTO RICO PERSONALS

EIGHT Puerto Ricans were recently designated by Eduardo C. Morales, M.D., Dr.P.H., Commissioner of Health of Puerto Rico, F.A.P.H.A., to receive fellowships granted by the Rockefeller Foundation's International Health Division for study in the United States. They are:

Dr. Norberto A. Quinones, who will study bacteriology

Dr. Juan Basora and Dr. Victor J. Montilla, public health

Dr. Abel de Juan, vital statistics and epidemiology

Dr. Jose R. Vivas and Dr. Libertad R. Gaetan, tuberculosis

Winifred M. Mendez and Carmen L. Rivera, public health nursing

It has been announced that Joseph H. Axtmayer, Ph.D., has recently returned to the School of Tropical Medicine of the University of Puerto Rico, conducted under the auspices of Columbia University, after a year of research in biologic chemistry at the University of Rochester; and Luis Hernández has returned from special study in clinical pathology at the University of Michigan Medical School, Ann Arbor.

Other members of the faculty who are studying in the United States and Europe include: Dr. Enrique Koppisch of the Department of Pathology, who is at Basel, Switzerland, studying filtrable viruses on a fellowship from the Rockefeller Foundation; Luis M. González, at the Henry Phipps Institute of the University of Pennsylvania, Philadelphia, Pa., for study of tuberculosis; Americo Pomales-Lebrón, at the University of Michigan for a doctorate in bacteriology; Dr. Rafael Rodriguez-Molina and Felix Lamela, at the University of Chicago, for courses in hospital management and administration.—*J.A.M.A.*, Sept. 21, 28, 1935, pp. 975, 1046.

PERSONALS

LEONARD GREENBURG, M.D., Fellow A.P.H.A., has resigned his position as Health Officer of New Haven, Conn., effective October 15. He has been appointed Executive Director of the Division of Industrial Hygiene, New York State Department of Labor. He has already

taken up his new duties and will have his office in the State Office Building, 80 Center Street, New York City. Dr. Greenburg has been identified with the Industrial Hygiene Section of the A.P.H.A. for many years and has been connected with the Department of Public Health at Yale University.

DR. ANDREW J. HAMILTON has been appointed Health Officer of Rison, Ark.

DR. JOSEPH L. BRYAN, of Xenia, Ill., has been appointed Health Officer of the district including Clay, Effingham, Jasper and Crawford Counties.

DR. JOHN A. McDONALD, of East Machias, Me., has been appointed District Health Officer.

DR. CHARLES F. MCKHANN, Assistant Professor of Pediatrics and Communicable Diseases, Harvard Medical School, Boston, Mass., has gone to China, where he will be Visiting Professor of Pediatrics at Peiping Union Medical College during the first half of the school year 1935-1936. He will return to Boston early in March, 1936.

DR. MELVIN L. HUTCHESON, of Denton, Tex., has been appointed Health Officer of Denton County, succeeding Dr. James H. Hicks.

DR. ELBERT W. WRIGHT, of Bowie, Tex., was recently elected Chairman of the Texas State Board of Health, succeeding Dr. Charles M. Rosser, of Dallas.

WALTER M. DICKIE, M.D., of Berkeley, has been re-appointed Health Officer of the State of California. Dr. Dickie had held the position from August, 1920, to 1931, when he was succeeded by Giles S. Porter, M.D., F.A.P.H.A. Dr. Dickie succeeds J. D. Dunshee, M.D., F.A.P.H.A., who resigned.

CLAIR E. TURNER, DR.P.H., Professor of Biology and Public Health at the Massachusetts Institute of Tech-

nology, Cambridge, Mass., Fellow A.P.H.A., has been invited by the University of Calcutta, India, to deliver a series of 6 lectures on the organization of health education.

EARLE G. BROWN, M.D., of Topeka, Kans., F.A.P.H.A., Health Officer of Topeka from 1919 to 1925, and since 1925 Secretary of the Kansas State Board of Health, has been appointed Professor of Hygiene and Preventive Medicine at the University of Kansas School of Medicine, Kansas City, Kans.

DR. ALIX CHURCHILL, Associate Secretary-General of the International Association for Prevention of Blindness, and Executive Secretary of the International Union Against Tuberculosis, recently arrived in the United States for a series of conferences in various cities on policies and procedures in the world-wide fight against blindness and tuberculosis. Dr. Churchill is the guest of the National Society for the Prevention of Blindness and the National Tuberculosis Association.

FRANK P. STROME, M.D., of the Harrisburg Department of Health, member A.P.H.A., has been appointed Chief of the Bureau of Vital Statistics of the Pennsylvania State Department of Health, to succeed Dr. William E. Matthews, who had served 46 years.

GEORGE A. HAYS, M.D., formerly with the Missouri State Board of Health, Jefferson City, Mo., has been appointed State Epidemiologist of Arizona, with offices in Phoenix. He succeeds Hugh F. Stanton, M.D., C.P.H., resigned. Both Dr. Hays and Dr. Stanton are members of the A.P.H.A.

CLELAND A. SARGENT, M.D., of Dover, Del., member A.P.H.A., for many years Director of Communicable Disease Control and Director of Infant and Maternal Hygiene in

the Delaware State Board of Health, has been provisionally appointed epidemiologist with the New York State Department of Health.

DR. PHILIP I. CREW has been appointed Health Officer of Marion, Ia.

DR. JOYCE I. HARTMAN has been appointed Supervisor of Health Education in the Cleveland, Ohio, public schools, succeeding Lyman W. Childs, M.D., member A.P.H.A., who had held the position since 1910.

DR. F. FLOYD SOUTH, and DR. ARCHIE C. VAN CLEVE, of Portland, Ore., have been appointed to the Oregon State Board of Health, to succeed Dr. Albert Mount, of Oregon City, and Dr. Joseph P. Brennan, of Pendleton, respectively.

DR. EDWARD J. FINN has been appointed Health Officer of Shelton, Conn., succeeding Dr. Francis I. Nettleton.

DR. JOHN D. MILBURN has been named Health Officer of East Hampton, Conn., to succeed the late Dr. Frederick T. Fitch.

DR. JOSEPH DAVID ARONSON, of the staff of the Henry Phipps Institute of the University of Pennsylvania, Philadelphia, Pa., has been appointed special expert on tuberculosis in the Indian Service under the Department of the Interior. He has been granted leave of absence from the Institute and has established headquarters in Albuquerque, N. M., from which he will direct a study of opportunities for preventive work against tuberculosis in New Mexico and Arizona Indians. After several weeks he will make similar observations on the Blackfoot and Crow Indians in Montana. Dr. Aronson is assistant professor of bacteriology at the University of Pennsylvania School of Medicine. Dr. Esmond R. Long, Director of Phipps Institute, has again been appointed

special consultant on tuberculosis; in this capacity he made a survey of the Papago Indians for the Indian Service last winter.

DEATHS

CLARENCE W. BUCKMASTER, M.D., member A.P.H.A., for 15 years Commissioner of Health of Yonkers, N. Y., died on October 7. He specialized in contagious diseases and his efforts won for Yonkers a national reputation for its low death rate. He organized an immunization campaign in 1927 which lowered the city's diphtheria total from 438 cases in that year to 3 cases in 1933. He was 63 years of age.

ALBERT PFEIFFER, M.D., Director of the Division of Social Hygiene in the New York State Department of Health, Albany, N. Y., died September 24, at the age of 53.

J. FRED ECKERSON, M.D., of Shelby Center, N. Y., died recently. Dr. Eckerson had been Health Officer of Shelby since 1904.

WALTER TREAT WALKER, Vice-president-in-charge-of-sales of the Kimble Glass Company, of Vineland, N. J., died at White Sulphur Springs, W. Va., on October 2.

JOSEPH C. BLOODGOOD, M.D., of Baltimore, Md., member A.P.H.A., died suddenly on October 22. He was Adjunct Professor of Surgery at the Johns Hopkins University School of Medicine. He also was on the staff of the Johns Hopkins Hospital and was chief surgeon at St. Agnes's Hospital, as well as head of the Hopkins Laboratory of Surgical Pathology. He was active in the fight against cancer.

CONFERENCES

Nov. 1, Mid-Year Meeting of the New York State Association of Public Health Laboratories, at the State Laboratory, Albany, N. Y.

American Journal of Public Health

and THE NATION'S HEALTH

Volume 25

December, 1935

Number 12

Public Health

A Problem in Distribution^{*}

WALTER H. BROWN, M.D., F.A.P.H.A.

Professor of Hygiene, Stanford University, Palo Alto, Calif.

THE address by your President-Elect at this time marks a departure from an established custom of the Association. In past years, it has been the duty of the President to report to you upon the state of the Association and present his recommendations for the future at the end of his term of office. It was his "swan song."

This new practice of permitting the incoming presiding officer to present his views at the beginning of his service has both advantages and disadvantages. It affords him an opportunity to indicate his evaluation of public health problems of the day and also assists in securing action upon them by the Association. On the other hand, it detracts somewhat from the objective point of view that would be possible at the end of his term.

Our retiring President, Dr. Bishop, has relieved me of the responsibility for reporting upon the state of the Association, and has presented a clear-

cut picture of many of the important problems before us. This leaves me free to devote the time at my disposal to a discussion of some fundamentals that need reconsideration if public health is to retain its rightful place in the new order of society.

As a background for our discussion it will be profitable to recall the great lag between our present knowledge of the cause, cure, and prevention of disease and the degree of success in securing an application of this knowledge. Within the lifetime of the Association, modern scientific investigation has placed in our hands the tools for the control of many of the communicable diseases, and has blazed the trail that will lead to the discovery of the causes and methods of control of the remaining ones. The complex and hidden causes of non-communicable diseases—such as heart disease, nephritis, and cancer, are yielding sufficient of their secrets to permit successful attacks upon them. We do not lack the knowledge of ways to reduce infant and maternal mortality. Even the difficult problem of mental diseases has reached the stage where cure is possible and prevention is often within our grasp.

^{*} Address of the President-Elect delivered at the Second General Session of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

This is not a mere enumeration of theoretical statements gleaned from the proceedings of scientific societies. It represents what has been shown to be true wherever qualified public workers have been given an opportunity to secure application of this health knowledge. There is no need to prove such a statement for this audience. You are engaged in demonstrating its truth in your daily work. There is need, however, of raising the question as to why your demonstrations have not resulted in a wider distribution and more stable maintenance of public health services.

It may be useful for us to remind ourselves of some rather unpleasant facts. Notwithstanding our creditable progress during the last decade, a large percentage of the population of our country remains without essential public health services. The qualifications, tenure, and salaries of our health workers are far from satisfactory. Partisan politics all too frequently dominates the appointment of the official, as well as administration and tenure of office. Our budgets for health service are small compared with other governmental agencies. Even these inadequate appropriations have been cut during the depression to the point of destruction of many essential services. Finally, and perhaps of greatest significance, no spontaneous protest has arisen from the public. You may charge me with painting a dismal picture. I am sorry, but these are facts. Our most important duty at this time is to face facts, if we are to plan wisely for the future.

The first step in this procedure would seem to be a critical analysis of the factors underlying these conditions. Our basic problem is finding more successful methods for securing a wider distribution of what biology, medicine, and administration have taught us will protect and improve human health.

Therefore, I invite you to consider

with me the topic: "Public Health—A Problem in Distribution." In common with our industrial confrères we have produced a great wealth of valuable products but have failed to secure adequate methods for equable distribution.

The essentials of a public health program that we now accept are the result of many years' experience of our leading health workers, crystallized and made practical through the constructive work of the Committee on Administrative Practice. In the field of federal and state services the details are not so clearly defined. There is need, as we will take occasion to point out later, for further clarification in this area. However, there can be no disagreement as to what the essential factors are that make possible a sound public health program in any field. We would enumerate them as: sufficient legal power to permit effective administration, adequate budgets, properly trained personnel, and intelligent public support.

It would seem superfluous to discuss sufficient powers with this group. Yet, the most casual analysis of barriers that obstruct the progress of public health reveals the difficulty that arises from the lack of powers—legal or administrative. We shall continue to suffer from instability in our public health services as long as they are not based upon sufficient legal powers.

The necessity for adequate budgets in order to permit satisfactory service is self-evident. The situation in this field is anomalous. We know the cost of the technical procedures that will prevent unnecessary illness and premature death. The price is ridiculously low as compared with other public services. Yet, year after year the health services of this country, with few exceptions, are supported upon the poverty level. We have been too modest both in our claims as to the

worth of health services and in our demand for appropriate financial support. Adequate public health programs demand budgets commensurate with the health needs of the community.

Public health has become a specialized field. Its problems require a high degree of technical knowledge and skill for their successful solution. This important fact is being tardily recognized by those who control the organization and administration of health services. This is one of the explanations of the present unsatisfactory status of qualifications, tenure, and salaries of health workers. It has deterred many capable individuals from entering the field of public health.

The inclusion of intelligent public support as an essential to satisfactory public health service needs no justification. Unfortunately, we have not been able to command it to any great degree. All too frequently our support has been based more upon emotion than upon reason because we have concentrated our attention on health service to the individual and neglected to educate him and demand public support for such services. The results have been manifest in the inertia of the public while essential health services, in many places, were either abolished or reduced to a poverty level. We cannot hope to maintain a high degree of health service until we find the way to secure and maintain intelligent public support for our programs.

These, then, may be accepted as essential factors necessary if we are to provide adequate public health services for all of the population. Let us have them clearly in mind as we review briefly the present status of our facilities for and methods of distribution.

It is not my purpose to discuss details of present public health programs. I desire to review briefly the administrative mechanism we have developed

for securing distribution of the benefits of modern scientific knowledge in the field of health. More particularly, my aim is to analyze these mechanisms for the purpose of determining where and how they may be improved. To this end we shall examine certain features of the official and voluntary health agencies and their relationships to the private practice of medicine.

An analysis of the present system of organization and administration of official health agencies reveals a wide variation in methods and effectiveness.

We find health functions of the federal government scattered through a considerable number of departments or bureaus. This system does not make for coördination since it depends too often for satisfactory relationships upon the spirit and personalities of the executives. Further, we find the usefulness of federal agencies frequently limited by lack of direct power within the states. One sees many instances where federal assistance properly applied would bring marked improvement in health services. Notwithstanding these handicaps, the assistance of federal agencies in solving state and local health problems has gradually improved under the guidance of skilled administrators. The question I desire to raise is what further steps are necessary in order to gain the highest potential benefits.

The status of state health organization and administration is of particular importance at this time, for if we are to be successful in securing a satisfactory widespread and permanent distribution of health services, it will require strong, well administered state health departments.

The variations in type of organization and administration of state health departments are characteristic of public health in the United States. Since each state is the sole judge of its own health needs, wide variations of

methods are inevitable. To a certain degree, this is desirable. The result, however, has been an uneven distribution of health services. We have not developed satisfactory standards for state health administration and there is but poor definition of the basic functions by statute.

As was indicated in the President's address, it is in local health administration we have made our most consistent and rapid advances. We have a well defined pattern of essential services required and standards by which such services can be evaluated. We know what they will accomplish and how much they will cost. Further, we have had numerous examples of how they can be successfully distributed to the ultimate consumer. We even have a few instances where they are so intelligently backed by public opinion that the depression did not interfere with them. The work of the Committee on Administrative Practice has been an important contributing factor.

Let us turn now to a brief consideration of the present status of three essential elements common to all units of health administration—legal powers, personnel, and budgets.

Variations in the laws under which official health services operate in the United States are of significance. An analysis of them reveals how far away we are from the attainment of a statutory basis that would be acceptable on a national scale.

Complete uniformity is neither necessary nor desirable. Sufficient power for properly controlling the organization of departments and securing effective carrying out of their programs is fundamental. I do not refer merely to enforcing of laws, though this is of importance. I do refer to the necessity for providing such powers as will reduce to a minimum the possibility of the domination of health services by political or other self-interest groups.

To amplify what Dr. Bishop has pointed out, methods of appointment, qualifications, and tenure of office of health personnel are far from satisfactory. The regular federal services are exceptions to this statement. While considerable progress has been made in placing certain grades of health workers under civil service, frequently important positions are filled without due regard for technical qualifications and without any guarantee of permanency of tenure. This will have an important influence upon the proposed expansion of official public health programs through federal aid.

It is difficult for me to speak temperately with reference to health budgets. Our record of inadequate health appropriations is a sad commentary upon our social judgment. Gradually health budgets were increased and services extended. The studies of Dublin, Shepard, Walker, and the Association tell the details of the story. They need not be recounted here. Reductions of budgets ranged from 5 per cent to the elimination of entire appropriations for some county units. In other places essential services were crippled or discontinued; all this with little or no protest from the public.

Such an episode almost compels us to seek an explanation of its causes. Certainly public health expenditures are not exorbitant when compared with appropriations for other public services. No informed person would say that the actual expenditures for health were excessive when compared with accepted standards for adequate services. The 90 cities entered in the Health Conservation Contest expended only \$.75 per capita in 1933. These figures are for cities which have shown a real interest in public health. The average expenditure for county health services is approximately \$.38 per capita while the state health appro-

priations averaged \$.13. Dublin summed up the matter in his Presidential address:

Altogether, we are spending something like 120 million dollars, or about \$1 per capita for health work of all kinds whether administered by official or private agencies. This is the amount which in the hey-day of public expenditure was allocated for this important service. On its very face, this amount is only a fraction of what is needed. The modest estimates prepared by our Committee on Administrative Practice call for appropriations of \$2.50 per capita if a well rounded program is to be maintained. In the counties, where health work is more difficult to conduct because of the distances to be covered, the expenditure to be adequate should be nearer \$3 per capita. In other words, *our expenditures in the past have never reached more than from one-half to one-third of what we could spend profitably.* There has been no wild development and no tendency to grow too fast. Very few communities have ever spent enough to derive the great benefits that sanitary science and modern medicine have made possible. It is with meager amounts indeed, that genuine achievements in disease control have been accomplished. We are still very far from where we can afford to cut down on public health work.

Excessive public health expenditures—either actual or relative—cannot account for unusual and unwise reduction in health budgets during a period when adequate health service was most needed.

This brings me to a consideration of voluntary health agencies. The evolution of these organizations has been one of the striking characteristics of the American scene. We find ourselves with a multiplicity of national and local voluntary groups engaged in some aspect of health service. Their total budgets amount to large sums. They enlist the services and interest of great numbers of trained and untrained workers. Sometimes they fail to act in harmony with the official agency. The policies, objectives, and methods of these organizations are frequently criticised. The opinion is held

by some that they have no further place in our public health program. It seems wise to discuss this opinion briefly.

Official agencies are not yet prepared with powers, personnel, or budgets to assume the useful public health functions now conducted or supported by these agencies. I am convinced that for many years to come, if not permanently, there is a useful and necessary function to be performed by independent, privately financed, properly conducted volunteer health agencies.

The protection of public health is essentially an official responsibility and we should encourage the adoption of and support for all essential health services under official responsibility as rapidly as possible. I am convinced there is much need for better coördination of some voluntary agencies with the official departments. These facts do not reduce the value of privately supported health organizations which have been and are being conducted in accordance with sound principles. In many places the volunteer agency is the only organized support of the health officials.

This statement is not intended as an approval for the indiscriminate organization and operation of national or local volunteer agencies. It would seem desirable for us to encourage the continued operation of those volunteer health agencies which are performing an essential service with proper relationships to the official agency. We might profitably bend our efforts toward securing better mechanisms for coördination of all health agencies and *seeing to it that they function.*

We come now to another important method for the distribution of health services. I refer to the private practice of medicine, specifically in its relationships to the programs of official and nonofficial health agencies. We

have in America the largest group of well trained medical men in the world; a system of hospitals and clinics second to none; and good educational facilities for undergraduate and postgraduate education in medicine.

In an era of organization and group activities, the age-old methods of individualistic practice of medicine are undergoing a severe test. The medical profession is making a valiant and highly commendable struggle to preserve all of the finest traditions and ideals of its honorable heritage. To these efforts we, as public health workers, pledge our heartiest support.

The growth and development of the American Medical Association is a splendid example of good organization. It has gradually expanded its program to meet the professional needs of its membership. This has made its present activity in the field of medical economics and public health relationships one of its primary functions at the present time. We are concerned particularly with the influence of medical-public health relations upon public health programs.

The diagnosis and treatment of disease have been the primary concern of the medical profession for centuries. Recently prevention has begun to occupy a more important place. Conversely, the public health profession has been primarily concerned with prevention and only incidentally with diagnosis and treatment. This situation has led inevitably to the time when the interests and activities of the two groups come into contact—either to merge or to conflict. This time has now arrived. The intelligent solution of this complicated and delicate issue is vital to both the professional groups and the public. The inherent objective of both groups is preservation and promotion of the health of individuals. The problem seems to be one of discovering better mechanisms for under-

standing and coöperation between professional organizations. I am convinced that they may be found.

This concludes a hurried and imperfect review of some essential factors necessary if we are to procure reasonably adequate health services. I trust it is understood that there is continued need for research leading to the discovery of improved methods of disease control and health promotion. I hope, however, that I have convinced you that our most important immediate task is the perfecting of methods for securing distribution of health services.

The time has arrived when we need a comprehensive, coherent national plan and policy for public health service. It should be sufficiently elastic to provide for a wide variation in the needs and conditions of the various geographic, political, and social units of our country. The public health workers, official and voluntary, are capable of devising such a plan and policy for discussion, modification, and final adoption. This is no short-time job, to be accomplished between two Annual Meetings of the Association. It demands a careful, painstaking review and evaluation of every aspect of health service. It calls for the wise use of our accumulated experience in every field of health. It needs to be a product of the best thinking of all professional groups. I make the proposal that we attempt to outline a coherent national health plan and policy with a full realization of its scope. I have considered the time needed and the work involved in bringing such a plan to its completion. Nevertheless, my earnest recommendation is that we make a beginning in order that we may develop an adequate integrated public health program for our nation.

The need for such a plan and policy is forcibly brought to our attention by the latest developments in our political life. We have devoted a special session

in this meeting to "Public Health in a Program of Social Security." Our retiring President has given us a thought provoking consideration of possibilities of the Social Security Act; and distinguished representatives of the federal services have presented tentative plans for its operation. These discussions signalize one of the most striking changes in public health history during the life of this Association.

The important task in public health administration of the immediate future will be the adjustment of federal, state, and local health relationships. The Social Security Act will make available greatly increased finances for public health service. Funds will be distributed on the well established principle of federal aid to states under definite conditions provided by the act.

The increased participation of the federal government in state and local programs requires careful adjustment. There should be no difficulty in establishing a proper relationship between the agencies that will permit ample local autonomy and, at the same time, assure sound, efficient local administration and programs. This presents a rare opportunity to raise the standards of public health practice as well as to extend such services.

We are assured that the keynote of the administration of the Security Act will be flexibility. This principle has demonstrated its worth in the hands of our federal agencies and some of our foundations. We look with confidence to the vision and wisdom of our official leaders in discharging their great responsibility, and pledge them our whole-hearted support.

Another important trend in public health administration is discernible in the rapidly changing socio-political picture. We refer to the inclusion of medical relief as a responsibility of the official health department. There is little disagreement as to the social duty

for the care and medical treatment of the indigent or even those persons otherwise self-supporting who are unable to provide themselves with medical care. There is a question in the minds of highly qualified health administrators as to the wisdom of including this responsibility among the duties of the health department. In my opinion, we should give judicious consideration to both aspects of this problem.

One phase of the matter was ably presented by a distinguished state health officer. The point was stressed that "health departments are better fitted by training to administer medical care given at public expense than are the welfare departments." Prevention and cure were considered as a unit problem and proposals made that state and local health departments be given responsibility for both functions.

Another angle which merits equally careful consideration comes from an experienced and skillful local health officer. He says, "Close coöperation between health activities and charity is essential—but while the two functions are linked together, they still remain *two* functions, separate and distinct, and it behooves the health department which seeks to maintain its true entity to consider well how it may preserve this free from public confusion." He outlines what are now considered to be the essential services for which the health department is responsible. He expresses a concern that if the administration of medical relief is added to these responsibilities, it will increase the friction between medical and public health professions and relegate the preventive program to a secondary position. Each of these points of view represents the opinion of a capable public health leader. Together they raise an issue that will have much to do with the character of official health programs of the future.

We should weigh this matter care-

fully in order that our health programs shall produce the maximum good. It may be that the next stage of our social evolution will require the extension of public health programs into the field of medical care. Perhaps no one plan can meet the widely differing social, economic, and professional conditions of our country. I am convinced, however, that additions to our present public health programs should not deflect our attention from the primary responsibility for the control of communicable diseases, sanitation, infancy and maternity service, school hygiene programs, and public health education.

The reference above to medical care leads naturally to a matter which calls for immediate and definite consideration. I refer to proper relationships between the medical and public health professions. Social objectives of both groups are identical—the protection, maintenance, and promotion of health of every individual. Your speaker is one of those who believe that *there are no insoluble problems* of relationships between the two professional groups.

He is convinced that it is a matter of adequate, continuous contact between the leaders of these groups on all matters of policy and program. This could be accomplished by a reciprocal representation on the governing bodies of the two associations. This plan would result in an opportunity for mutual understanding and discussion of policies and plans of the organizations at a time when this would be most effective.

May I urge the medical and public health leaders—national, state, and local—to consider this matter and to approach its solution in a spirit in keeping with the traditions and ideals of both groups.

Health education is another problem that should occupy our attention in the immediate future. A frank evaluation

of present methods and objectives in this area is clearly indicated. Health education has come to be a term with which to conjure. It is used indiscriminately to describe the activities of the quack, commercial interests, and the educator. Unfortunately the laity has great difficulty in separating the wheat from the chaff. This situation is one of the primary reasons why we do not secure intelligent, consistent public support for health programs.

It would be profitable to attempt bringing about a clarification of objectives and an integration of the activities of those legitimately engaged in health education programs. This should include official health and education departments, voluntary agencies, and the organized medical and dental professions. It has become increasingly apparent that no one of these groups can pursue its own projects independently.

With a common objective as a starting point, it would be possible for national, state, or local agencies to fuse their educational activities into a unified health education program. This would bring about greatly increased effectiveness for each participating agency without any loss of group integrity. Of even more importance, it would result inevitably in an increase of public confidence in the advice, proposals, and activities of all organizations.

It would appear that this is a particularly propitious time to attempt a coalition in this field.

It is my desire in the closing section of my remarks to call your attention to some of the ways in which the Association may contribute to a better distribution of health service. The first is searching for methods by which our Association can better serve the professional needs of all public health workers. This statement is not intended as an implied criticism of the

past efforts of either individuals or committees to provide such services. It is meant to express my conviction that the time has arrived once more for us to review the development of our organization as a guide for future action.

In 1929 we revised our Constitution. At that time we entrusted the major responsibilities for the direction and control of our affairs to a strong Executive Board of five standing committees. Five years of operation have demonstrated the essential soundness of this decision. Notwithstanding handicaps of readjustment and finances, we have made substantial progress in practically every division of our activities.

It would be a mistake, however, not to exercise continuous care and assure adequate, satisfactory representation of all groups on the governing body and committees. An Amendment to the By-laws was passed at this session to correct one such situation that has caused some dissatisfaction. A wider participation of our membership in the technical and administrative affairs of the Association would tend to strengthen the organization and train leaders for future responsibility.

We are glad to express gratification that it is possible to return to the practice of having a full-time Executive Secretary. The expanding interests of the Association require the undivided attention of a well qualified, and enthusiastic executive. In my opinion, the Executive Board has chosen such an individual in Dr. Reginald M. Atwater. We look forward to a period of increased activity under his administration.

In his presidential address in 1926, Winslow said: "The American Public Health Association has progressed almost as far as is possible along its present lines as a primarily national or rather international organization. Its

future depends upon the development in every state of the Union and in every province or other corresponding administrative district of Canada and Cuba and Mexico of strong local branches bound to the parent Association by membership and joint collection of dues."

I can do no better than to adopt this statement as my own with the plea that we endeavor also to bind these regional organizations to the parent association with ties of professional service. Those of us who come from the West Coast realize keenly how necessary these ties are. The live interest of the parent Association in the Western Branch has created a feeling of solidarity in that region which is essential for the health and strength of our national organization. We hope that renewed efforts will be made to extend such regional and local organizations.

The Committee on Fellowship and Membership has a difficult assignment. Their report of another gain in membership this year is gratifying. A study of their activities shows that they have year after year appealed to all groups by every approved method for assistance in increasing our membership. Yet an undesirably large number of public health workers remain on the eligible list. The committee cannot do this job alone—it needs the *active* coöperation of every member of the Association.

The growing complexity of the Annual Meeting presents difficulties for the Committee on Meetings and Publications. The increased number of speakers, with demands for more, rather than fewer, scientific sessions has rendered simplification almost impossible. The committee is hard pressed to supply conveniently located meeting rooms. The selection of the Annual Meeting place grows more trying each year. This matter deserves

constructive thought and active coöperation of the sections with the committee. We must not discourage the healthy expansion of scientific activities. We should avoid the meetings becoming so unwieldy as to reduce their effectiveness or seriously limit the parts of the country in which the meeting can be held.

We celebrated the 15th birthday of the Committee on Administrative Practice at this session. We look to it for continued leadership in its vital task of raising the standards of public health practice and stimulating the extension of public health services.

The survey of the State of Massachusetts which they are to conduct with the coöperation of the Commonwealth Fund indicates that they are to study state public health practice. They will, no doubt, coöperate with the State and Provincial Health Authorities in the development of methods for the promotion of improved facilities for state health departments to meet their enlarged responsibilities, for, if national participation in regional health activities on an increased scale is to be effective, it will hinge upon the effectiveness of state health departments.

I heartily endorse Dr. Bishop's statement regarding the work on the Committee on Research and Standards.

Before concluding my remarks, I wish to consider with you the training of health personnel and their professional qualifications. A study of our present educational facilities indicates that they are inadequate and poorly distributed. We have a number of well equipped schools of public health and many effective courses for training specialized workers.

It would be wise to develop training centers on a regional basis. The courses offered should be planned to meet the needs of all grades of workers in every essential line of public health service. The levels of training should

range from short courses to those leading to degrees or certificates with concentration in a special field of activity.

In planning these centers, use should be made wherever possible of the already established schools and the courses now being offered at various institutions. It is expected that the plans outlined by the Public Health Service under the Social Security Act will go far toward the solution of this problem.

Standards of professional qualifications for *specialist* in public health are needed. The Committee on Professional Education has been at work 3 years on this complex problem. Its activities have been conducted through sub-committees representing the various specialties. Agreement upon minimum educational standards has been reached in some groups. Others are only beginning discussions. In one instance, the problem is so complicated that further discussion is needed to reach a satisfactory solution.

We might consider the experiences of our medical and dental confrères in their struggles to raise professional levels. It proved necessary, and also wise, to erect their first technical standards upon the qualifications of those already engaged in practice on a creditable level. This might be a useful principle if applied to public health workers.

We should make every effort to raise the personal and professional qualifications for all health workers. It will require unusual wisdom, patience, and tolerance. I am convinced that we can and will use all of these. May I, therefore, cordially endorse the statement of the retiring President that the work of the Committee on Professional Education is of most immediate and pressing importance.

May I close with a personal word to the members of this Association who have honored me to serve as President

for the coming year. This responsibility is great—to the discharge of it, I shall give the full measure of my ability. I can find no words to express my gratitude equal to those of President Benjamin Lee in 1901 and echoed by Winslow in 1926:

"One who has devoted the best

years of his life to the study and practice of preventive medicine . . . may be pardoned if he expresses the sentiment that having received the verdict of his long valued friends and deeply respected peers, the summit of his ambition has been attained and earth has no richer prize to offer him."

A Veterinary Centenarian and Discoverer

DR. GRIFFITH EVANS, of Bangor, North Wales, attained his hundredth birthday, August 7. While in the army veterinary corps in India he discovered the trypanosome of surra, a disease of horses, camels and cattle. In 1885 this protozoön was named *Trypanosoma Evansi*. He thus laid the foundation of protozoön pathology, in which the next discoverer was Bruce, who in 1894 found that tsetse fly disease of animals was due to another trypanosome. (*Trypanosoma Brucei*). In 1903 he and Nabarro found that the tsetse fly also was the carrier of trypanosomiasis. In a letter to the *Times*, Dr. Ivor J. Davies of Cardiff recalls a visit of Osler to that town. He asked, "Where does Griffith Evans live?" A reply not having been forthcoming, he said: "What! Don't you know the

man who first saw a pathogenic trypanosome?" On his birthday Dr. Evans received in his bedroom a telegram of congratulation from the king and queen at the moment when Sir Frederick Hobday, principal of the Royal Veterinary College, presented a scroll stating that it is proposed to set up in the college a plaque recording the fact that Dr. Evans, the father of the veterinary profession, consented to lead the endowment movement.

Dr. Evans replied from his bed, to which he is confined by an accident, in a voice that could be heard outside the house. He discoursed for half an hour on scientific problems and mentioned that in his college days no microscopes were provided for students.—London Letter, *J.A.M.A.*, Sept. 14, 1935, p. 893.

Fifteen Years of the Committee on Administrative Practice^{*}

I. The Initial Steps

LOUIS I. DUBLIN, PH.D., F.A.P.H.A. (*Life Member*)

*Third Vice-President and Statistician Metropolitan Life Insurance Company,
New York, N. Y.*

IT is my pleasant duty to recall the initial steps which led to the organization of the Committee on Administrative Practice. I shall then turn the discussion over to Professor Winslow, who has been its guide and leader from the very beginning. He will tell you of the many activities developed by the committee. Finally, Dr. Rice, the Commissioner of Health of New York City, will attempt to evaluate some of the more important of these efforts to show in what ways they have served the public health movement during the last 15 years.

The earliest public health activities in America were extremely limited in scope. Up to the last decade of the 19th century, they consisted, for the most part, in the abatement of nuisances and the quarantine of epidemic diseases. A few weak attempts were made here and there to meet specific health problems, but very little was accomplished. In the 90's, Dr. Hermann M. Biggs of New York brought the bacteriological laboratory into the picture and largely as a result, the scope of the health movement broadened by leaps and bounds. The attempt to

control tuberculosis, the infectious diseases of children, and the venereal diseases were the immediate fruits. Later, the promotion of child hygiene and the educational work of the public health nurse extended the old-fashioned health department into an active and obviously useful agency.

By 1920, it seemed fairly desirable to take account of stock and, perhaps even more important, to consolidate the gains that had been achieved. On every hand, enthusiasts in the special fields of health promotion were urging the importance of their particular part of the program. In each city, certain of these special fields had been developed, some of them to a high degree, while other possible activities were wholly or almost wholly neglected. The conscientious health officer was calling for guidance. What should he undertake and to what extent? How could the usually limited funds at his disposal be most advantageously used? These were some of the questions which health officers were asking themselves everywhere.

Dr. Chapin of Providence had crystallized this point of view and questioned various activities which were passing for approved service in those days. He queried, especially, those practices which concerned the abate-

^{*} Read at a Special Session of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

ment of nuisances and a number of others which he thought were hardly within the scope of the public health officer. In 1915, in his study of state health departments, he showed for the first time how a quantitative evaluation of health service could be made. Dr. Chapin's work and the discussions that followed left a very definite impression that this was a good time to bring together the facts with regard to the current practices in American municipal health departments. It was accordingly, in 1920, that the Committee on Municipal Health Department Practice was appointed by the American Public Health Association to conduct such studies in the field of municipal service, very much as Dr. Chapin had shown in connection with the state work.

As far back as 1916, we, in the Metropolitan Life Insurance Company, had become greatly interested in the character of the organization of municipal health departments. The company, through its Welfare Division, under Dr. Frankel, had committed itself to a program of coöperation with health departments all over the country. The company had organized an extensive nursing service for the care of its millions of sick policy holders; it offered health officers large quantities of health literature for distribution and, perhaps most important, it agreed to employ its agency force and its other instrumentalities to arouse the interest of the policy holders in plans which the local health officer might have to extend his service. Under these circumstances, it seemed to us very desirable to get a glimpse of the status of health work the country over. Some cities were obviously further advanced than others and there was a great variety of procedures. Could the general level of health work be raised by making available to all health officers the facts with regard to the

most approved practices as demonstrated in the leading communities?

In February, 1916, a circular letter was sent out to the Metropolitan managers in the various parts of the country urging them to associate themselves with the plans of health officers and to find out for themselves the essential facts with regard to the work which was going on in their health departments. A brief blank was supplied for the record of their observations. A large volume of material came in indicating a great variety of conditions and of organization. In 1919, a more detailed and definite questionnaire was sent out in the hope that more useful information concerning local public health work could be obtained. As this inquiry progressed, it was discovered that some of the information would have to be supplied by the health officers themselves. After some experimentation, it was evident that we must give up the idea of relying on our managers to obtain this information, and the attention and coöperation of the health officers themselves must be secured. In April, 1920, a schedule was prepared which it was planned to send to the health officers of the 250 largest American cities asking them to supply the basic facts with regard to the organization and services rendered by their departments. They were also asked to state their more urgent needs and their plans for future expansion and particularly what the company could do to aid them in their local efforts. Before this questionnaire was actually distributed, it seemed desirable to try it out on a few of the more critical sanitarians of the country such as, Professor C.-E. A. Winslow, Dr. Charles V. Chapin, Dr. Donald B. Armstrong, Dr. Allan McLaughlin and others.

On May 17, 1920, I sent to Dr. Lee K. Frankel a report on the conferences with the sanitarians to whom the ques-

tionnaire had been sent. They were unanimous that the proposed investigation was timely and that there were great possibilities in the program, if properly conducted. There was considerable doubt, however, as to the ability of the company to gather the information directly by the questionnaire method. Professor Winslow was especially skeptical. In order to make the answers worth while, the questions had to be specific and technical in character. Because of the wide scope of the inquiry, the questionnaire must be lengthy and would involve a great deal of labor on the part of the health officers. There was virtual agreement among the conferees that the best method would be to have the actual inquiry conducted by trained persons working under the auspices of the American Public Health Association and with the approval of the state boards of health. Local health officers would coöperate with a representative of the state department where they might refuse information to the Metropolitan. It was, therefore, suggested that the company ask the Section on Public Health Administration of the American Public Health Association to appoint a special committee to take charge of the work, and especially to make the necessary contacts with the state and local health officers. The funds required for the actual canvassing were to be supplied by the company. Professor Winslow suggested that \$5,000 would see the work through, and this amount was appropriated.

In this way was initiated the work of the Committee on Administrative Practice. It was very clear from the outset that the committee must have Professor Winslow as its chairman. He very graciously accepted that responsibility. As you all know, he has for 15 years, except during his term as president when Haven Emerson served

as chairman, carried this burden with tremendous enthusiasm, initiative, and wisdom. He was associated at first with Dr. Charles V. Chapin, Dr. Wade H. Frost, and myself acting as Secretary. In the next few months, the committee was enlarged to include Dr. Donald B. Armstrong, Dr. Haven Emerson, Dr. Allan W. Freeman, and Dr. Lewis R. Thompson of the U. S. Public Health Service. Later, as the committee formulated its plans and began to function, its membership was extended to include a number of active health officers. To make sure that our plans were in keeping with the practical needs of the men on the firing line, many conferences were held with health officers all over the country and their active coöperation sought.

Never was a more congenial group of men gathered to carry on a task and never did they work more actively and intelligently to further their objective. The questionnaire was quickly beaten into shape. Space does not permit me to present this historic record form but I am filing it in the archives of the Association where it may later be examined by interested students. It consisted of 24 pages, each 12" x 18", and covered what we then believed to be the main points in the organization of municipal health departments. The problem of gathering the information from the large cities of the country was not easy to solve. It was essential that the information should in all cases be obtained through the visit of a personal representative of the committee to each city. Otherwise, many of the questions would have remained unanswered; others would have been misunderstood and the results from the various cities would have been vitiated through the lack of comparability or reliability. It was, therefore, decided that the surveys should be conducted by a small number of investigators acting for the committee, each using

the schedule in the same way and following certain rules and interpretations of the items as agreed upon. Each member of the committee undertook to be responsible for a group of cities in his immediate vicinity. We were extremely fortunate in obtaining the active coöperation of Surgeon-General Hugh S. Cumming of the U. S. Public Health Service, who generously assigned Dr. Lewis R. Thompson to the committee for a period of 10 weeks. Dr. Thompson surveyed 16 cities. In addition, the Surgeon-General directed 5 members of his staff located in various parts of the country to coöperate with the committee in completing the surveys of 9 cities in their immediate vicinities. The American Red Cross helped us by placing Homer N. Calver at the committee's disposal for the survey of 5 cities. I well remember canvassing the situation personally in the 8 cities on the Pacific Coast. Mr. Tolman, the Secretary, covered cities in the northeastern part of the country. Altogether, we received returns for 83 cities with populations over 100,000. This material became the source for a wealth of publications which soon began to appear under the imprint of the committee.

The tabulation of the material was an extensive task and W. T. Fales, then a student under Professor Wade H. Frost at Johns Hopkins, and Professor Ira V. Hiscock, associated with Professor C.-E. A. Winslow, were extremely helpful in tabulating the data and in digesting the material. At the Annual Meeting of the Association in New York City in November, 1921, the committee presented its first report, being a summary of its findings under 18 different main divisions. It appeared in the January, 1922, number of the *American Journal of Public Health*, and will always remain a landmark in the history of the Committee on Administrative Practice. It was

this material which later, much elaborated, resulted in *Bulletin No. 136*, published by the U. S. Public Health Service and entitled "Report of the Committee on Municipal Health Department Practices of the American Public Health Association."

This *Bulletin*, published in 1923, contained 468 pages and was divided in three main sections. The first prepared under the editorial supervision of Dr. Allen W. Freeman of Johns Hopkins, consisted of 18 chapters, each one on a special aspect of health department organization. The several chapters were prepared by members of the committee and their associates. Dr. Freeman wrote the important chapters on The Health Board and the Health Officer, Control of Communicable Diseases, Water Supplies, and Sewage and Sewage Disposal. Professor Hiscock summarized the findings on Infant Hygiene, School Health Supervision, Public Health Laboratories, Milk Inspections, Food and Drug Inspections, and Sanitary Inspection and Sanitation. Professor Winslow reported on Tuberculosis, and Public Health Nursing. Mr. Fales analyzed the Expenditures of Health Departments, and Mary Augusta Clark of the American Social Hygiene Association obliged with a chapter on Venereal Disease Control. Finally, I had the pleasure of contributing a summary of the procedures in Vital Statistics, and a member of my staff, Miss George Anundsen prepared a chapter on Public Health Education.

The second section was prepared by Professor Winslow and Dr. H. I. Harris who outlined An Ideal Health Department for a City of 100,000 Population. This ideal organization purported to "represent the best practice of the day in each of the various lines of health department work as observed in some one or more of the cities studied." It was in no sense a

visionary project, but was based entirely on the standards employed by the leading cities in each particular phase of health work. No form of procedure was suggested which had not proved practicable in some city under actual working conditions. This hypothetical health department, therefore, furnished an excellent measuring rod for the third section in which Dr. Emerson did an especially interesting piece of work in analyzing the individual practices of each one of the 83 cities studied.

The work of the committee was now fairly launched. It had proceeded far enough to clarify its program by announcing in 1924 the following three specific objectives: (1) the study of public health procedure; (2) the standardization of public health procedure, and (3) the presentation of the studies and standards to those members of the Association who may find them useful. I shall leave it to Professor Winslow to develop the work for the committee from this point. I desire only to say that what followed has become indelibly associated with the history of the Association during the last 11 or 12 years and with the extraordinary progress that has taken place in public health activity in the United States during this interim.

There are, however, one or two minor phases of the work of the committee which I think it is proper that I should consider briefly. The first refers to the personalities who have been associated with the committee during its history. We were extremely fortunate in bringing together a group of men who were congenial to one another and who were ready to give of their very best, irrespective of the time and effort which were called for. I need not sing the praises of Professor Winslow. His service on the committee speaks for him. It is a pleasure to record the extremely useful work of

Dr. Charles V. Chapin during those early formative years. His knowledge of health practices, his point of view, his critical acumen in revising the schedules, guided us away from a great many errors. Dr. Allen W. Freeman was a mountain of strength. He made the first major publication possible. Dr. Haven Emerson was always ready to help with his fertile imagination outlining new activities and new ways of making the work of the committee practically useful. It is impossible, of course, to list all of those who were associated with us in the initial group. I refer to these members because they have continued to serve the committee from the very beginning. I hope the other members who have worked equally hard will not take it amiss if I do not refer to their special labors, except that I must single out the contribution of Dr. George W. Palmer, who was largely responsible for the present form of the city appraisal form. In all, there have been 36 members of the committee since its beginning. Ten of them have served at least 10 years. Seventeen have served 5 or more years. Nine of our committee members have served as President of the Association and one of them is now President.

We were also extremely fortunate in our choice of Field Secretary or Executive Officer. The first of these was Mayo Tolman, a breezy picturesque character, who first set the work of the committee in motion. He had been a student of Sedgwick's and was a veritable dynamo of energy. He did an excellent job in drawing up the first schedule and in keeping hold of the many details of the first survey as it ran through the hands of many workers.

He was succeeded by a man of a very different type, no one less than ex-President Dr. Watson S. Rankin, of North Carolina. Dr. Rankin threw himself into this effort with enormous energy and with years of experience

behind him. For years he had been thinking of establishing norms by means of which we could measure the relative values of particular types of health work. His main contribution was the creation of the appraisal form which has had such a remarkable influence on the work of the committee. It was under his administration also that the schedule received a thorough revision, largely through the efforts of Dr. George W. Palmer, and became much more adapted to its purpose. Dr. Rankin's greatest contribution, however, was his ability to win the confidence of the health officers of the country and to obtain their acceptance of the committee's plan of evaluation and of standardization of practice, two factors very essential to the success of the future work of the committee. He resigned in 1925 to become Director of the Hospital and Orphan Section of the Duke Foundation, Charlotte, N. C.

He was succeeded by Dr. W. Frank Walker, who had gained wide experience through the survey of the American Child Health Association and in association with Dr. Henry F. Vaughan in Detroit. It will be quite impossible to credit Dr. Walker with all of the good works for which he was responsible. It was in his administration that the survey work of the committee was inaugurated. The time had arrived when individual cities wishing to go deeper into their health organization than the mere cataloguing of information turned to the Association and the committee for intensive surveys. Dr. Walker conducted these on a large scale and established an activity which has become an important one in the life of the Association. He also launched the City Health Conservation Contest. This was nothing short of a stroke of genius because it was through these contests that the possibilities of the schedule and the appraisal form

could best be realized. The competition set up through hundreds of cities joining together in the Contest has resulted in immeasurably raising the standards of public health work in the cities of the country. Later, the City Contest resulted in the organization of the Rural and County Contests, generously supported by the Kellogg Foundation. The Association is under tremendous debt to Dr. Walker for these many services. He resigned in 1931 to become Director of Public Health Studies of the Commonwealth Fund, and was succeeded by Dr. Carl E. Buck. It is hardly necessary for me to evaluate the services that have been and are being rendered by Dr. Buck and his staff. He is a worthy successor to the splendid men who have preceded him in this position.

Finally, it is my pleasure to refer briefly to the financing of the committee's work. It will be remembered that the first contribution was made by the Metropolitan in 1920. The company has continued to be interested in the work ever since. By 1927, we had succeeded in arousing the interest of other life insurance organizations which in more recent years have helped to finance the Health Conservation Contests. In 1925, the Milbank Memorial Fund contributed \$10,000 and in 5 years made available a total of \$40,000. The Commonwealth Fund made its first contribution toward the work of the committee in 1928 and has since then been a continuous and generous contributor, its total financial help amounting to \$135,600. Most of this large contribution was expended in conducting the work of the Subcommittee on Evaluation of Administrative Practices. Altogether more than half a million dollars has been expended by the committee during the 15 years of its history. Not a small part (\$128,000) of this total has been actually earned in services rendered by

the committee and its members in making surveys, and through consultation service in carrying the point of view of the committee into practical effect in individual states and cities. Altogether, there is in the financial history of the committee an excellent example of what can be done when a good idea works through channels of practical and trained men. I have no doubt at all that for every dollar spent by the committee, a great many more dollars have been loosened from municipal and state sources to improve public health work in the United States

not only temporarily but permanently.

In closing, it has been one of the great satisfactions of my life to have been instrumental in the organization of the committee, in helping to make possible its financial support, and in playing some part in the development of its program. The work began innocently enough through an interest arising in my office. The developments which followed have helped to make my work—and I am confident the work of hundreds of others—in the field of public health more significant and valuable.

The Hall of Fame, New York University

EARLY in November, the 1935 voting took place by which selections were made to fill additional niches in the Hall of Fame at New York University. There are spaces for 150 busts and of these 69 are now filled. The new election included William Penn, Simon Newcomb, and Grover Cleveland.

Most interesting to health workers is the fact that the highest name on the list of those who fell short of the necessary three-fifths vote of the 101 electors was none other than our own Dr. Walter Reed, the conqueror of yellow fever. He received

57 votes—61 would have elected him.

The history of these elections shows that most of the names have appeared in several lists before they were finally elected and it would seem quite probable that Dr. Reed may be elected at some time in the not far distant future. Of the 72 names already on the list, it is said that 13 are statesmen, 16 are authors, 5 are teachers and theologians, and 5 are educators. Seven are women. Most of the other names are men of letters. Nominees are not eligible for consideration until they have been dead for 25 years.

Fifteen Years of the Committee on Administrative Practice*

II. The Evolution of the Program

C.-E. A. WINSLOW, DR.P.H., F.A.P.H.A. (*Life Member*)
Professor of Public Health, Yale School of Medicine, Yale University,
New Haven, Conn.

THE Preacher long ago warned the people of Israel that "there is no new thing under the sun"; and the attempt to standardize health practice is no exception to the rule.

Haven Emerson, in his Sedgwick Memorial Lecture on Public Health Diagnosis traces the germ of the idea back to the *Doomsday Book* of William the Conqueror in 1086. Edwin Chadwick's report on *Sanitary Condition of the Labouring Population of Great Britain* (1842), Lemuel Shattuck's *Report of the Sanitary Commission of Massachusetts* (1850), and the report of the Citizens' Association of New York, *Sanitary Condition of the City* (1865) were more directly in our line of descent.

These early surveys were, however, primarily concerned with the sanitation of the physical environment rather than with administrative health practice. For the first real attempt to make a comprehensive evaluation of all the health aspects of community life in definite and detailed form, we must turn to the records of our own organization. At the Philadelphia meeting of the American Public Health Association

in 1874, a committee of 24 was appointed "to prepare schedules for the purpose of collecting information with regard to the present condition of public hygiene in the principal towns and cities of the United States, and the laws and regulations, state and municipal, relating to the same."

I have a photostat copy of the survey schedule prepared by John S. Billings (President of the Association in 1880) for this committee,¹ and it is one of the most interesting documents in the history of public health. It contains 411 specific questions under the following 20 headings: Location, Population and Climate; Topography and Geology; Water Supply; Drainage and Sewerage; Streets and Public Grounds; Habitations; Gas and Lighting; Garbage and Excreta; Markets; Slaughter Houses and Abattoirs; Manufactories (and Trades); Public School Buildings; Hospitals and Public Charities; Police and Prisons; Fire Establishments, Alarms, Engines, etc.; Cemeteries and Burials; Public Health Laws, Regulations, Officials-Municipal; Registration and Statistics of Diseases; Quarantine.

The schedule for Hospitals and Public Charities is a forerunner of the studies carried on so effectively by the American Hospital Association; and

* Read at a Special Session of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

the last three of the schedules listed above are precisely in the line of the work of the Committee on Administrative Practice. They cover the constitution, personnel, salaries and powers of boards of health, number and qualifications of staff, quarantine practice, annual reports, registration of vital statistics, mortality from important diseases and at important age periods.

This was truly an amazing document. It was, however, too far ahead of the times for widespread application. Forty years must pass before this germinal concept came to actual fruition, under the influence of another great pioneer, Charles V. Chapin of Providence. In one after another of his addresses he emphasized the need for quantitative evaluation of health practices.² In 1915 he showed for the first time in his study of state health departments how such an evaluation could be made.³ Five years later, in 1920, the Committee on Municipal Health Department Practice was appointed by the American Public Health Association as a result of those conversations between members of the Association and officials of the Metropolitan Life Insurance Company which Dr. Dublin has described.

The general objectives of the committee were stated as follows in its first annual report (1921).⁴

The need of authentic information on the practice of municipal health departments of American cities has long been recognized by all engaged in public health work. It is generally known that a great variety of procedures are in effect; that the organization of the health departments differs in different communities; that the amounts spent per capita for any branch of health service vary considerably and that, in other respects, few standards are available to health officers who would pattern their departments after those which predominate in American practice or achieve most satisfactory results. It was thought that the collection of data as to the current practice of large municipal health departments would repay the effort and that

perhaps, out of such an investigation it would be possible to discover the best procedures and to forward the movement for the simplification and standardization of health department practice in our cities.

A year later, in the fall of 1922 the A.P.H.A. at its Cleveland meeting adopted the report of its Committee on Reorganization which emphasized this problem as a primary function of the Association itself in the following paragraphs:

The objectives of the Association should be the preparation, study, standardization, and presentation of scientific public health procedures, the best method by which such knowledge can be given to the public, and the expression to the public of professional opinion in regard to such procedures.

Later on under Section C, *Information File*, the report recommends

... that there be maintained at the central office of the Association such records as are obtainable and can be kept current with regard to the organization, expenses, procedures and results of public health practice in organized health departments in countries represented in our membership.

In 1923 the committee through the assistance of the U. S. Public Health Service, completed—as Dr. Dublin has described—its first important study, a survey of health practice in the 83 largest cities of the United States. In this year, too, Dr. W. S. Rankin obtained leave of absence from the State of North Carolina to serve as its first full-time Field Secretary.

By 1924, the committee had proceeded far enough with its work to clarify its program by announcing the following three specific objectives:

1. The study of public health procedure
2. The standardization of public health procedure
3. The presentation of the studies and standards to those members of the Association who may find them useful.

In 1923 and 1924, the committee attacked its second major objective, the preparation of an appraisal form for

the measurement of actual administrative achievement by a quantitative objective scoring procedure—again following the lead provided by Dr. Chapin in 1915.

Early in its career (1923) the committee had suggested that its studies should be extended to Canada, Cuba, and Mexico and to states, counties, and small municipalities as well as to large cities. In 1925 its name was changed from Committee on Municipal Health Department Practice to Committee on Administrative Practice in order to indicate its potential wider scope. The Milbank Memorial Fund made its first grant to the committee in this year; the first city *Appraisal Form* was completed; and Dr. W. F. Walker succeeded Dr. Rankin as Field Director.

For the year 1926, Dr. Haven Emerson served as Chairman of the committee and its first active subcommittees were organized, dealing with County Health Practice, Administrative Record Forms, and Analysis of Health Department Functions and Results. In the fall of this year, at the Buffalo meeting, the committee was reorganized and placed on a permanent basis with a membership of 16 made up as follows: 12 members at large, appointed for 4 year terms, the terms of 3 members expiring each year; the 3 officers of the Health Officers Section (later changed to 3 representatives appointed by that Section); and the Executive Secretary of the Association. This change essentially involved the recognition of the committee as the "technical service division" of the Association.

In 1927 the committee published *Community Health Organization*, under the editorship of Professor I. V. Hiscock, which was its first comprehensive effort to present the results of its studies in the form of a complete program of standard community health

service. In 1928 the Commonwealth Fund joined the list of our generous supporters by making a grant for studies of 3 state health departments and of rural county services.

In 1929, was held the first Health Conservation Contest, sponsored by the U. S. Chamber of Commerce and actually conducted under the technical guidance of the committee, with funds provided by a group of life insurance companies. This step (although foreshadowed by certain earlier efforts of the committee) marked its first comprehensive effort along a new line. Nearly 10 years had been spent in collecting data, in formulating standards, and devising methods of appraisal. The time was at last ripe for using these technics in an organized effort to raise the general level of health practice throughout the country.

In 1930, the committee undertook still another task, the evaluation of individual health procedures with a view to improving the details of health practice. At first we could only establish standards on the basis of group judgment, and for some time to come most of our practice must rest upon this basis. Slowly but surely, however, we hope to remould group judgment by the test of accurate scientific analysis of methods and results.

In 1931, Dr. Carl E. Buck replaced Dr. Walker as Field Director. In 1933 our first comprehensive survey of rural health service was issued under the editorship of Dr. A. W. Freeman; and in 1934, the Health Conservation Contest idea was applied to county health departments under a grant from the W. K. Kellogg Foundation.

Such have been the high points in the chronological history of the Committee on Administrative Practice. It may be noted that its activities group themselves in logical order under 5 main heads: (1) collection of data as to actual administrative practice, (2)

formulation of a typical or normal program of adequate community health service based on those data, (3) the preparation of an appraisal form by which actual health services in a given community may be objectively measured, (4) the making available of the knowledge and experience of the committee to health officers in such a way as to promote sound local programs and, finally, (5) the securing of public backing for such programs, by using the standards and the comparative ratings at our disposal to stimulate emulation as between various local areas.

First of all, it was necessary to obtain a clear idea as to the actual practice of American communities in the field of health organization. Such a picture, as it related to state health departments, Dr. Chapin had given us in 1915. Dr. Dublin has shown how—with funds provided by the Metropolitan Life Insurance Company and with the generous coöperation of the U. S. Public Health Service—we prepared and published our first comprehensive survey of municipal health practice.⁵ This has been so fruitful in its results that it is now a little difficult to visualize the obscurity in which we labored before information of this kind was available. The younger health officers can scarcely imagine what it meant to develop a health program with no knowledge whatever of practice elsewhere—except such as we might pick up in conversation at meetings and by visiting or corresponding with neighboring departments.

Bulletin 136 proved so valuable that the American Child Health Association almost at once began a similar study of services in 86 smaller cities (40,000 to 70,000) which was published in 1925.⁶ Our own committee, again in coöperation with the U. S. Public Health Service, resurveyed the 83 cities studied in 1920 as of the year

1923 and extended the limits of population down to the 70,000 figure which was the upper limit of the A.C.H.A. study. This second survey of 100 large cities was published as *Bulletin 164* of the Public Health Service in 1926.⁷ Thus 10 years ago, we had already gained a reasonably clear picture of actual administrative practice in the 186 cities of the United States which had populations of over 30,000 in 1920.

In 1927, the International Health Division of the Rockefeller Foundation resurveyed the state health departments for the Conference on State and Provincial Health Authorities⁸ and finally 2 years ago, our own committee presented (under the editorship of Dr. Allen W. Freeman and with Dr. Crittenden as principal field surveyor) the results of a comprehensive survey of rural service.⁹ This investigation (generously financed by the Commonwealth Fund) was made under the direction of a sub-committee headed by Dr. E. L. Bishop and involved two separate lines of approach. Carefully prepared questionnaires covering the major items of information desired were sent out to all full-time county health departments and returns were actually received and tabulated for 337 such counties. This general information was supplemented by an intensive survey of 46 counties in 28 states and 2 Canadian provinces. These counties were selected to represent various geographical areas of varying economic status and to include both organized counties (27) with full-time health officers, and unorganized counties (19) representative of the four-fifths of our rural counties without full-time health service. By combining the information obtained in these two fashions a remarkably clear picture (and a very challenging one) was obtained of the achievements made, and of the disheartening gaps which still

remain unfilled. This report was another pioneer accomplishment of major import to the cause of public health—comparable only with the first city survey begun in 1920.

The Committee on Administrative Practice feels that the time is more than ripe for a second re-survey of state health departments, and hopes to be able soon to undertake that task if the Conference of State and Provincial Health Authorities should desire it. At some future date, a re-survey of rural health service will no doubt be desirable. In the municipal field, however, it seems probable that the stage of comprehensive and nation-wide surveys may perhaps have passed, at least as far as purely quantitative studies are concerned.

What is needed now in the municipal health field is (1) up-to-date information as to current changes, in the form of general trends such as those concerning budget allotments and personnel; (2) continuing review of new administrative procedures in special fields; and, particularly, extensive as well as intensive studies of particular procedures with a critical analysis of costs and of results actually attained. The first sort of information can be obtained by the questionnaire method, the second by visits to particular cities where special advances have been made.

In its 1923 report, the Committee on Administrative Practice recognized the need for "a central clearing house for current information in regard to health department practice." It seemed to the committee that "the natural and logical first step was to provide for the keeping up-to-date of the information already secured at considerable cost in regard to the large cities of the United States." The U. S. Public Health Service was, in our judgment "the logical body to lead in this work in view of its general program and policies and in view of the service which it has

rendered to so many individual communities in the line of counsel as to administrative health procedure." The matter was therefore presented to Surgeon-General Hugh S. Cumming and, to our great gratification, he agreed to establish within the U. S. Public Health Service an office of Administrative Health Practice, under the direction of Dr. Paul Preble.

The office of Administrative Health Practice has proved of the greatest value but during the past few years the need has become increasingly apparent for somewhat more intensive efforts than have heretofore been possible along the lines of continuing analyses of current progress. The information available to us in the returns made by cities competing in the Health Conservation Contest seemed of potential value in this connection. In 1932, therefore, the C.A.P. created a new sub-committee on Current Health Department Practices under the chairmanship of Dr. J. W. Mountin. Dr. Mountin had succeeded Dr. Preble as chief of the Division of Administrative Practice of the U. S. Public Health Service. Recent analyses made by this committee of health department budgets and personnel in the depression have been published in the *American Journal of Public Health* during the current year and furnish powerful arguments for checking and compensating for the serious inroads which have been made upon the health defenses of the nation.

The second task of the committee was to utilize the material assembled through our surveys in the form of a typical community health program which might be set up as a norm or as a general guide to be used by any community which aspired to provide really adequate health protection for its citizens. It required some courage in 1920 to attempt such a task and I well remember the trepidation with

which we approached it. In our first important contribution, however, the 1923 report (*Public Health Bulletin 136*) we included a chapter on *An Ideal Health Department for a City of 100,000 Population*, prepared by Dr. H. I. Harris and the writer.¹⁰ This was, so far as I am aware, the first attempt ever made to formulate a standard community program. As our studies advanced, it seemed desirable to expand this program and to modify it in the light of the new information at our disposal, and Professor Ira V. Hiscock was asked to prepare a new draft of the standard program. This was issued in 1927.¹¹ In 1932 a second revision of this report on *Community Health Organization* was published, again under the editorship of Professor Hiscock.¹² Its sound analysis of administrative policy and the philosophy of broad social relationships involved make this, in my judgment, a document of the very first importance.

The somewhat adventurous policy involved in the attempt to formulate in detail an adequate well balanced community health program has been more than justified by experience. It has been astonishing even to those of us who have been most hopeful to see how completely the scheme of ideal community health organization has actually fitted the facts. It is no static program, for new opportunities for productive health service are continually opening before us; and successive editions of the outline must continue to reflect such advances. At a given moment, however, the actual practice of the most advanced cities corresponds in striking degree to the standard program; and when we began to apply it to the handful of rural areas with really adequate health service the correspondence proved equally close. One of the most valuable features of *Community Health Organization* lies in its

estimates of the personnel and budget necessary for satisfactory service. Here, too, experience shows close conformity between theoretical computation and actual results. Again and again, we have found in comparing a given city with the general scheme that precisely those activities which had less than the estimated budget allotment were the activities which in practice fell short of reasonable attainment. It is, in large part, thanks to this document that we can stand with complete confidence on the requirement of \$2 per capita (from official and voluntary agencies combined) as essential for the support of an adequate community health program—in rural as well as urban areas.

A second phase of this general problem of developing sound health practice has been concerned with the working out of standards for certain details of health department procedure, as distinguished from the broad general program as a whole. This function has been largely performed by a remarkably active and devoted series of sub-committees which include many coöpted members from outside the C.A.P. itself. The first of these sub-committees were organized in 1926. They include at present the following fields of work: Record Forms, for many years under the chairmanship of Dr. George C. Ruhland, recently succeeded by Dr. George T. Palmer; Organized Care of the Sick, under the chairmanship of Dr. Michael M. Davis; Manual of Public Health Administration, under the chairmanship of Dr. Henry F. Vaughan; Annual City Health Department Reports, originally headed by Dr. C. H. Jones, now under the chairmanship of Dr. John L. Rice; Public Health Nursing under the chairmanship of Sophie C. Nelson; and Relationship of Social Workers to Public Health, under the chairmanship of Dr. W. Frank Walker. All of these committees have been

active and have published reports at varying intervals. The achievements of the sub-committee on Record Forms have been, perhaps, particularly notable and have recently borne fruit in a Manual on Record Forms which has just been completed and is ready for publication.

For the most part, our standard procedures have rested on the empirical basis of practice, as exemplified in the actual work of health departments. We have long felt, however, that our ultimate goal must be to substitute for empirical group judgment more exact knowledge based on the statistical analysis of results actually achieved. To this end we organized in 1930 a new sub-committee on Evaluation of Administrative Practices under the chairmanship of Dr. Haven Emerson, and with financial support from the Commonwealth Fund. The aim of this committee is to take up one by one certain definite and specific procedures, to analyze them in detail and to measure the results in preventing morbidity and mortality actually attained by particular methods of administrative control. The task is an extremely difficult one and progress is necessarily very slow. Already, however, four contributions of substantial importance have been made in this field. They have dealt, respectively, with the comparative merits of various procedures for active immunization against diphtheria (Dr. William H. Park); with isolation procedures for the control of scarlet fever (Dr. John E. Gordon); with the effect of immunization of certain specific age groups in the control of diphtheria (Dr. Edward S. Godfrey); and with the effect of varying types and amounts of prenatal care upon maternal and infant mortality (Drs. M. Tyler, Harold H. Walker and John H. Watkins).

Additional studies are now under way with regard to methods used in the

control of infant mortality and to isolation procedures for the control of measles and whooping cough. We believe that, in spite of their inherent difficulty, studies of this kind furnish the only assurance of developing our public health practice on a really sound and scientific basis. We hope and trust that resources may be found for continuing such investigations in the future.

The third major task of the committee was to devise a method by which the health officer could appraise the results actually attained by his own program and determine how far it corresponded to the best current practice and how far—and in what particular respects—it fell short of such practice. If the preparation of a normative community health program called for a certain temerity, the attempt to formulate a definite scheme of appraisal was even more hazardous. Could any plan be devised that would be reasonably applicable to various communities with their widely differing problems? Would not the attempt to formulate a score card or measuring rod for so complex a thing as a community health program lead to a sterile mechanism unrelated to reality? Would not any possible scheme work hardship on certain health departments and lead to unmerited criticism? If it did gain acceptance, would it not tend to standardize an incomplete program and prevent progress? I can scarcely make my hearers realize how grave these objections seemed to us; but I can perhaps illustrate our state of mind by recalling that one of the most valued members of the committee resigned rather than participate in so unscientific a procedure.

Nevertheless, the committee as a whole felt that the possible results were worth all the risks; and we decided to go ahead. In April, 1923, Dr. Chapin prepared the first draft of

an appraisal form "to provide in the first place for an evaluation of the relative importance of various lines of public health activity, and in the second place for an estimate of the service actually rendered along each line of activity." During the next year, 1924, Dr. Rankin, as Field Secretary of the committee, devoted a large share of his time to the problem. Fortunately, the American Child Health Association, as a result of its study of the 86 smaller cities had realized the same need for an appraisal form. The two organizations recognized the importance of coöperation and, in a conference lasting about a week, the two independent forms were consolidated into one. The plan was presented for counsel and advice to the New England Health Institute and to groups of health officers in Ohio and Michigan. The various national health organizations were consulted with regard to the respective sections in which they were particularly interested. In August, representatives of the New England, Ohio, and Michigan health officers spent 4 days in revising the document, and took it home for actual use in the field in order to test its possible value. In its report for 1924 our committee commented on the matter as follows:

We are convinced that an appraisal form, if it can be arrived at by the procedure here outlined, would prove of real value to the individual health officer in helping him to develop a balanced departmental program based upon relative values; to check up on the performance of his own bureaus and thus maintain the department at the highest point of efficiency; to defend himself when unjustly attacked, by showing that his department is organized in accord with the views of his professional colleagues; to secure funds for expansion by indicating where his organization falls short of that generally accepted as ideal; and to secure the coöperation of local voluntary health organizations along the most effective lines.

The possible advantages of the appraisal idea were forcibly presented as

follows in the report of the American Child Health Association on the use of its first tentative rating schedule in the 86 cities of between 40,000 and 70,000 population. This report says:

As a brief for annual appropriations of the Department of Health—In several cities the rating schedule has been used to show in a comparative objective manner certain deficiencies in the department of health, and the expenditures which would be required to secure a full credit in place of these deficiencies. When presented in this manner to the appropriating body of the city, as a part of the health officer's budgetary request, the health department was, in one instance, the only department of the city government to receive an increase (amounting to 14 per cent) for the coming year. In another instance in the face of a strong movement for retrenchment throughout the city government, the health budget, presented in the light of the rating schedule, was the only departmental budget to remain uncut.

As a basis for a Health Program—The value of the rating schedule as an outline of a well balanced health program has appealed to several health officers to such an extent that their future programs are definitely based upon achieving the standards set in the schedule. . . .

As a basis for an Annual Report—It has occurred to one health officer to incorporate in the annual report of his health department the detailed rating of his city, for the 83 items included in the schedule, and to publish the score attained, with full discussion of many of the items. Another health officer has largely improved the character of his annual report in the light of the *Appraisal Form*.

As a means of interesting a Mayor or Chamber of Commerce—In a city which had recently scored itself the health officer was studying the rating when the mayor of the city happened to enter the office of the health department. Upon being shown the low rating of the city in diphtheria prevention the mayor inquired what could be done to improve the situation. When the health officer explained that he could secure a full score (30 points) if he had \$175 with which to buy toxin-antitoxin, the mayor promised to make the sum available from special funds. Other health officers have taken the rating of their city to the mayor or the chamber of commerce and by comparing the local rating with that of other cities have awakened a new interest in the city's health record.

As a means of arousing and cementing the interests of the Departments of Health and Education and of the private agencies in each other—A striking outgrowth of the use of the rating schedule in one city where the findings were reported in a special meeting, was the development of a new sense of the interdependence of all health agencies on each other and the formation of a joint health committee on which all agencies were represented under the leadership of the health officer. In another instance the rating schedule brought to the health officer for the first time the realization that he should coöperate with the department of education in its health work if his city was to secure the fullest return from its health activities. School medical inspection was promptly started.

Such evidence as this greatly strengthened our conviction of the value of the plan; and after the elaborate sampling of group judgment described above, tentative drafts of the *Appraisal Form* were issued for further preliminary study in March and in August of 1925 (the latter being called the first edition). The form was finally revised, approved, and officially distributed in a second edition as of January, 1926.

Prepared in this way, with the co-operation of so large a group of health officers and of all the voluntary national health agencies, the *Appraisal Form*, from the first, met with a reception which belied our fears. To compare health department achievement in various communities on the basis of death rates was clearly unreasonable on account of inherent differences in local sanitary, social and economic problems. To compare appropriations and personnel alone was as obviously unfair, since available resources might be used with great or with little efficiency. Between resources on the one hand and mortality rates on the other we had chosen the measuring rod of actual services performed in the belief that "such activities, conscientiously performed over a reasonable period, inevitably lead to the ultimate end of all

public health work—the conservation of human life and well-being." The objective and generally quantitative measures of performance (now nearly 200 in number) were sufficiently numerous to be truly representative; and the standards adopted—based, in general, on the actual performance in each respect of the upper fourth of the cities for which data were available—were fair and reasonable.

To avoid the danger of over-standardization and calling a halt on progress, it was agreed that the *Appraisal Form* should be revised at intervals of 3 to 5 years; and in 1926 a sub-committee was appointed under the chairmanship of Dr. George T. Palmer to prepare a revised form. The third edition, on which this committee labored with tireless energy, was issued in January, 1929. Its most important change lay in the fact that instead of a total 1,000 point score for all activities the new form was based on a 100 point score for each major activity, with a conversion factor making it possible to compute a total score when desired. This change was significant of an altered emphasis. In 1924 we thought of relative values as our major problem; by 1929 we had come to realize that "an estimate of the service actually rendered along each line of activity" was the most important aim which could be realized by the use of the form.

Meanwhile, in 1927, a second sub-committee on Rural Health Work, under the chairmanship of Dr. E. L. Bishop, had prepared a tentative *Appraisal Form for Rural Health Service*, a second revised edition of which was issued in 1931. A little later, we extended the idea to the field of industrial hygiene and a sub-committee on Industrial Health Appraisal was appointed under the chairmanship of Dr. L. D. Bristol. This committee issued in 1933 a form for scoring industrial health

services which is now being tested out in actual practice. A fourth edition of the *Appraisal Form for City Health Work* was published in January, 1934, utilizing many new ideas developed in connection with the rural form.

On the whole, the success of the appraisal concept has exceeded our most optimistic expectations. So far as we are aware, the fear that low scores might be used as a basis for unfair criticism of health departments has proved to be unfounded; and the danger of undue complacency resulting from high scores has been avoided by periodic revision with rising standards of attainment. Many just criticisms have been made of individual items, but most of these can be met and are being met in successive editions, which are prepared in the light of actual use by the health officers of the country. The objection that our form measures quantity rather than quality of service is in part a valid and inescapable one; but experience has shown that a large proportion of the quantitative standards of appraisal actually depend for their attainment upon quality of service as well. Another real objection lies in the difficulty of giving weight to the preventive services performed by private physicians; but the form does provide for their inclusion wherever records of such services can be obtained. The *Appraisal Form* has fully justified itself by the test of application. In hundreds of careful surveys its indication of shortcomings in particular activities has been fully substantiated. The best health departments throughout the country use it as a routine measure of their own efficiency; and it has proved, as we believe, one of the most powerful forces ever brought to bear on the general improvement of public health practice.

Our fourth objective was to make the results of our surveys, our standards of administrative practice and our ap-

praisal procedures directly available to the health officers who must ultimately utilize them in actual practice. This has, in part, been accomplished by the simple publication of our surveys, of the various editions of *Community Health Organization* and the *Appraisal Forms*, and by the reports of our various sub-committees. Correspondence with individual health officers in regard to details of administrative practice has occupied a large part of the time of the committee staff; and in 1925 we began the regular issue of a *Health Officers News Letter* to disseminate current information of a more general nature.

A more direct and important type of service has been involved in the provision by our staff of individual local surveys and consultations to particular communities desiring such aid. In the report of the committee for the year 1923 this problem was discussed as follows:

In addition to the collection and dissemination of information in regard to current procedures it was felt that something more was necessary. As we understand the aims of the members of this association they desire a clear picture of present conditions chiefly in order that those conditions may be improved in the future. Public health practice is in a dynamic, not a static, condition. The object of the health official is to improve the machinery now at his disposal so as to raise it to the highest point of efficiency and to supplement that machinery by obtaining new appropriations sufficient to make his organization meet the requirements of the new public health. It has seemed to your committee that the most important service which the American Public Health Association could possibly render to its members would be to establish a direct field service for the assistance of the executive officers of health departments along the lines laid down above.

The assistance of the Metropolitan Life Insurance Company made it possible to begin a service of this kind in 1924.

The surveys made by the committee

have been essentially of two kinds. The comprehensive studies conducted on cities in 1921 and 1924 and on rural counties in 1932 were made chiefly for the purpose of accumulating data on which our standards of practice could be based; and of course from every survey our staff learns something which is applicable in other surveys. Aside from the three general studies mentioned above, however, the staff has in the last 15 years conducted surveys in 31 states, the District of Columbia, and the Islands of Hawaii. Sixty-five of these surveys have been made in 56 cities (9 being re-surveys), 36 in 24 counties (including 12 re-surveys) and 6 in 5 states (one re-survey). All of these surveys were primarily designed for the guidance of the communities in question rather than for the accumulation of information by the committee itself.

For the most part these local surveys have been paid for by the communities concerned; and this seems in general a sound procedure. Our present policy was announced in 1933 as follows:

The Committee on Administrative Practice of the American Public Health Association offers the following types of health service:

1. Complete or partial health surveys of states, counties, municipalities or organizations.

Such surveys involve a complete stock-taking of the health facilities of the organization or area under consideration; a careful analysis of services rendered in relation to existing problems and cost; and, finally, a report on findings and recommendations for future program.

2. Consultant service in relation to specific problems.

Such service would include, for example, advice and assistance concerning: the inauguration of a new division or activity such as child hygiene; record keeping; how to determine the degree of diphtheria protection among children of different age groups, etc.

3. Advice on readjusting health activities or programs to new conditions precipitated by the necessity for extraordinary economy.

All the above services are rendered at cost, on a *per diem* basis, except where a com-

munity or organization desires a definite contract, so that only such service as is actually rendered is paid for.

We have always felt, however, that the committee should have at its disposal resources which would make it possible under special conditions to make surveys urgently needed by particular communities where no local funds to pay for the study were at the moment available. We still hope that this ideal may ultimately be realized.

The fifth and last of our major objectives, the securing of popular support for public health programs by using the appraisal scheme to arouse local interest in health achievement, is somewhat distinct from the rest of the committee's work. It might quite logically have been undertaken by some other organ of the Association. The idea of developing a sound competitive spirit between various communities in the field of health administration was, however, as I recall, a dominant factor in the mind of Dr. Lee K. Frankel of the Metropolitan Life Insurance Company. When the first grants were made for the committee's work in the year 1923, we suggested that it might be helpful to award medals to certain cities of outstanding merit in community health service, as evidenced by their showing on a special scoring plan. This suggestion was criticised in a subsequent discussion at the Boston meeting and after obtaining by letter the reactions of the health officers of the 83 large cities the project was abandoned for the time being.

Three years later, however, in 1926, the idea was revived in a modest form and on a small scale by coöperation of the committee with the General Federation of Women's Clubs in an annual competition between towns, in which the local clubs prepared a brief summary of the health service of their community, and a free survey was provided by us for the town having the best

record. In the next year Dr. W. Frank Walker (who had been chiefly responsible for establishing contact with the Federation) interested the U. S. Chamber of Commerce in the promotion of health work through its bulletins and other publicity material.

Finally, by 1929, the time seemed ripe for a really comprehensive project. The appraisal form idea had gained general acceptance by this time and preliminary exploration of the general sentiment of health officers showed that the doubts experienced 6 years before had largely disappeared. Dr. Louis I. Dublin was successful in obtaining financial support from a group of life insurance companies, and the first Health Conservation Contest was actually undertaken. This contest, which has now become a regular annual event, is sponsored, both nationally and locally, by the Chamber of Commerce and financed by the coöperating insurance companies. The preparation of a brief appraisal form to be used in submitting returns, and the actual awards are handled by special committees appointed by the U. S. Chamber. The technical conduct of the work, with its extensive field service is, however, in the hands of the C.A.P. staff, and certificates are delivered to the health officers of the winning cities in the 6 population groups at the Annual Meeting of the American Public Health Association. In 1933, when the funds for the support of the contest were reduced, we were forced to call upon the state health departments for aid in the necessary consultation service; and the hearty and generous coöperation of the state health officers has been most gratifying.

The number of cities actually submitting schedules in the city contest rose from 108 in 1929, to 172 in 1931, and fell again to 97 in 1934.

Last year, through the generous support of the W. K. Kellogg Foundation,

it was possible to inaugurate a similar Health Conservation Contest for county units, parallel with the city conservation contest and carried on in essentially the same fashion under the auspices of the U. S. Chamber of Commerce.

As in the case of the committee's earlier pioneer ventures, so with the conservation contests, anticipated difficulties have been conspicuous by their absence. Only in the rarest instances have complications developed and, on the whole, the health officers have been enthusiastic over the contest and its results. It would be possible to recount scores of individual instances in which high attainment in the contest has been a major factor in maintaining appropriations and protecting personnel. I personally know that in two of the largest cities of the country a health officer whose tenure was seriously threatened received reappointment from a new administration almost wholly as a result of the concrete evidence of achievement furnished by the *Appraisal Form*. Many more cases could be cited in which low scores in the contest have been successfully used as arguments for increased appropriations at points where particular deficiencies had been revealed. It would be difficult, I think, to cite any single force that has done more to protect and promote high standards of health service than has the Health Conservation Contests.

In the first 15 years of life of the Committee on Administrative Practice it has thus been possible to attain in considerable degree all of our five major objectives.

The committee has developed a technic of health surveys and has so applied that technic as to present a reasonably clear picture of administrative health practice in the United States in both urban and rural areas.

It has crystallized the best elements of such practice in the form of a

Manual of Balanced and Adequate Community Health Organization which has proved of incalculable value in promoting progress along sound and fruitful lines; and has supplemented this general outline by the preparation of standard record forms and by intensive evaluation studies with regard to individual procedures.

It has prepared an *Appraisal Form* which is today generally accepted as a valid instrument for the objective and quantitative measurement of actual attainment in the field of administrative health practice and for the weighing of the relative degree to which various activities should be modified to build a balanced program.

It has rendered direct survey and consultation service to hundreds of cities, and serves at all times as a center for the interchange of information as to the most promising current trends in the field of administrative practice.

In coöperation with the U. S. Chamber of Commerce, it has made possible the carrying out of Health Conservation Contests in such a way as to promote sound competition between various communities and to stimulate those communities to a higher degree of moral and financial support for their local health programs.

These results have been made possible by a number of fortunate circumstances. We could have done nothing without the generous aid of the Metropolitan and the other insurance companies, the Commonwealth and the Milbank Funds and the W. K. Kellogg and other foundations which have supported our work. We have depended for wise guidance on the untiring service and the sound judgment of the committee membership; and I may say that in a somewhat wide experience of committee work I never knew a group with so harmonious a spirit and so universal a readiness to work as the

C.A.P. We have owed a very large part of the results achieved to our Field Directors, Dr. Rankin, Dr. Walker, and Dr. Buck, to Dr. Wallace and the other members of our field staff, to such active special collaborators as Professor Hiscock, and to our office secretaries, Mrs. Fraas and Miss Tonnele. Above all, however, the work of the committee has been made possible by the active participation of the members of the A.P.H.A. as a whole and particularly of the health officers—who took so large a share in the surveys, in the preparation of the *Appraisal Form*, and in the application of all the results of our studies. As a matter of fact, it is not the C.A.P. which has done these things. It is the health officers themselves who have accomplished results through the instrumentality of the committee as their central clearing house.

Herein lies the real significance of the entire chapter in the history of public health which we have here reviewed. A professional group of public functionaries has determined to pool the resources of its knowledge and experience in order to establish and maintain the highest possible standards of scientific attainment and of public service. During the brief period of 15 years they have worked out such standards and made them fruitful in actual achievement from one end of our country to the other. They have transformed administrative health practice from a medley of local and accidental enterprises to a concerted national program, growing and developing with the years, modified wherever desirable to meet local conditions, but everywhere based on sound basic principles and moving along considered and directed lines of progress. In so doing they have registered one of the major advances in the story of man's conquest of preventable disease; and they have set an example which may well have

its followers in other areas of the complex field of governmental service.

REFERENCES

1. Medical Education. Extracts from Lectures Delivered before the Johns Hopkins University, Baltimore, 1877-8, by John S. Billings, M.D., Surgeon, United States Army. Baltimore: William K. Boyle and Son, Book and Job Printers, Corner Baltimore and St. Paul Streets, 1878.
2. Chapin, Charles V. How Shall We Spend the Health Appropriation. *A.J.P.H.*, 3, 3:202 (Mar.), 1913; *Providence Med. J.*, XVII:12 (Jan.), 1916.
3. *A Report on State Public Health Work Based on a Survey of State Boards of Health.* American Medical Association, Chicago, 1915.
4. First Report of the Committee on Municipal Health Department Practice. *A.J.P.H.*, 12, 7:7 and 128 (Jan. and Feb.), 1922.
5. Report of the Committee on Municipal Health Department Practice, by the Committee on Admin-

- istrative Practice, in cooperation with the U. S. Public Health Service. *Pub. Health Bull.* 136, 1923.
6. *A Health Survey of 86 Cities.* American Child Health Association. New York, 1925.
7. Municipal Health Department Practice for the Year 1923. Based upon Surveys of the 100 Largest Cities in the United States. *Pub. Health Bull.* 164, 1926.
8. Health Departments of States and Provinces of the United States and Canada. *Pub. Health Bull.* 184, 1929.
9. *A Study of Rural Public Health Services.* The Commonwealth Fund, 1933.
10. An Ideal Health Department for a City of 100,000 Population. *A.J.P.H.*, 12, 11:891 (Nov.), 1922.
11. *Community Health Organization.* Edited by I. V. Hiscock. American Health Congress Series, Vol. II, Part IV. American Public Health Association, 1927.
12. *Community Health Organization.* Edited by Ira V. Hiscock. The Commonwealth Fund, 1932.

The X-ray Examination of Tinned Foods

THE consideration which has been given to the accepted methods of examination of tinned foods reveals that, short of the actual opening of a tin, extreme difficulty is associated with the giving of an accurate diagnosis as to the soundness of the content. Too often it would seem that stress is laid on methods which rely on the use of the human senses and consequently the findings may be very diversant according to the examiner's interpretation and the acuity of his sense organs. For instance, percussion, palpation, and shake tests might give very different results at the hands of a zealous inspector, or alternatively, at the hands of an importer. Disputes with consignees in the various ports I have been associated with led me to search for new methods which could be employed for the examination of this type of food.

One day while reading a technical article on the application of X-rays to industry, and especially in connection with examination of flaws in steel, it occurred to me that it might be possible to adopt X-rays to the examination of tinned food.

. . . Radiography has the following advantages:

1. A permanent record is available for inspection by anyone and may be of use in legal proceedings.
2. The tin is not opened and if deemed to be sound is available to the trade and its price saved.
3. An opinion may be vouched more quickly than in detailed internal inspection.
4. The personal error is more nearly eliminated than in the percussion, palpation, and shake tests.

W. S. Walton, M.D., D.P.H., *J. Roy. San. Inst.*, May, 1935, pp. 600-608.

Fifteen Years of the Committee on Administrative Practice^{*}

III. The Viewpoint of a Health Officer

JOHN L. RICE, M.D., F.A.P.H.A.
Commissioner of Health, New York, N. Y.

WE all realize the substantial progress that has been made in administrative public health during the past 15 years. Who or what has been responsible for this advance, in putting public health a little closer to the goal of greatest usefulness? Effective intelligent leadership has played the leading rôle. Has this leadership come from one or more health officers working in separate committees? Has it come from a physician or group of physicians who decided that public health must go forward? Has it come from unofficial health agencies leading the way? Has it come from the general public or from city governments' realization that public health is an investment rather than an expense? While some of these have taken a part, the real leadership has come from the Committee on Administrative Practice, a group of experienced, earnest public health workers who have pooled their broad knowledge and experience and have evolved most of the steps that have been effective in raising the level of public health administration throughout the country.

WHAT HAS THE COMMITTEE DONE FOR THE HEALTH OFFICER?

Since the organization of the Committee on Administrative Practice 15

years ago, it may be safely stated that *all* health officers have reaped substantial benefits from its activities. I refer particularly to the service it has rendered by: (1) providing the health officer with standards of performance for various public health activities by which he is able to analyze his program objectively; (2) setting up a well balanced plan for a public health program; (3) suggesting standard forms for recording information on essential health services; (4) making available expert personnel for consultation and advice on special problems, as well as for complete surveys; and (5) stimulating and encouraging improvements in community health programs through the annual Health Conservation Contests.

Standards of Performance—The history of the development of standards for evaluating public health work, and the pressing need for such standards, are so well known that it is unnecessary to repeat the story here. Nor is it necessary at this time to dwell upon the differences in viewpoint regarding the real value of the *Appraisal Form*. It is important, however, to point to a few significant results which have followed the development and intelligent application of these standards.

We are all familiar with the expansion of health department activities from the basic sanitary and communicable disease control work to a

^{*} Read at a Special Session of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

broader and more comprehensive program embracing most of the essential elements for the protection of the community's health. Until recently this expansion was due in a large measure to the pressure brought to bear upon the health officer by local groups interested in some special phase of public health work, such as tuberculosis, baby welfare, or public health nursing. This resulted in over-development in certain fields, while other services have been under-developed or omitted. Moreover, in many instances it produced a program with little or no relationship to the immediate needs of the community.

The Committee on Administrative Practice, by setting up standards of performance and suggested methods for showing the relationship of one activity to another, has enabled the health officer to approach more scientifically the problem of working out a balanced program, one designed to meet the existing situation. By a careful analysis of the public health services in his community he obtains a clearer picture of the adequacy of the present program, and he is able to build up interest in the neglected fields, or to some extent lessen the pressure for more service in others that are already well covered.

National and local agencies gain a more balanced viewpoint when confronted with a picture of the local public health situation as reflected in such a study, and become ready and willing to lend their support to the development of other activities where the need is greater.

Health Conservation Contests—The Health Conservation Contests sponsored by the U. S. Chamber of Commerce in coöperation with the Committee on Administrative Practice have had a far-reaching effect in arousing community interest in public health work. As a means of bringing about

lasting improvements in health programs of competing communities, too much confidence should not be placed in these annual competitions. Nor should a too literal interpretation be placed upon the numerical ratings of cities, as it is quite likely to breed dissatisfaction among health officers and others in the community interested in promoting sound public health service.

Consultant and Survey Service—One of the most important features of the work of the Committee on Administrative Practice is its consultant and survey service. Through its careful study of administrative practices in states, cities, and counties throughout the country, its field staff is well equipped to give expert advice on special problems confronting the health officer, or to make a detailed survey and evaluation of all services in the community, with a view to working out a more adequate and well balanced program.

When I came to New York City as Commissioner of Health, one of the immediate needs was a thorough study of the Health Department staff. It was important to know what each person was doing; how well the work was being done; what shifts in personnel could be made to bring about greater efficiency within the department. With a staff of approximately 2,500, and with many pressing administrative problems, it was obviously impossible for me, personally, to make such a study. I quite naturally turned to the Committee on Administrative Practice as the best qualified agency to undertake this work. The report which the field staff presented upon completion of an intensive personnel study has been used as a guide in making numerous changes among the staff and thus has been an important factor in increasing the efficiency of the department.

A survey and appraisal was also

made at my request by the committee's field staff, and we are now using this analysis as a basis for further re-organization of the department and in planning the program for the coming year.

Besides this as time goes on one has a basis for measuring advances or back-sliding in the department.

Time will not permit a further review of the constructive contributions of the committee. I should like to devote some time to a brief discussion of some of the things, which from my viewpoint as a health officer, I feel should be considered in planning its future program.

WHAT ARE THE FUTURE POTENTIALITIES OF THE COMMITTEE?

The Committee on Administrative Practice has exerted a wide influence in promoting the evaluation of public health activities. I believe the time has arrived when the committee should evaluate its own activities to determine which are worth while and should be continued, which should be discarded, and what new activities should be undertaken.

Free Service—The present program of the committee includes Consultant and Survey Service, which is rendered to communities at cost. There are many communities, perhaps those needing this kind of help most, which are unable to pay the cost of this service. Some way should be found for making the service of the field staff available without cost to needy cities. Take for example, a small city that has a special administrative problem. A day spent with the health officer in working out this problem would be of untold value to him, and it would not involve a great outlay of money on the part of the committee. I am strongly in favor of free service for those unable to pay, and believe that

it should be a part of the future program of the committee.

Current Information Service—One of the objectives of the committee is the supplying of information on current administrative practices. Admittedly this has not been one of its major activities. Yet I know of no greater need among health officers than some central source to which they can turn for up-to-date information on administrative procedures.

During the past year we were confronted with the question of adopting a regulation permitting the sale of vitamin D milk in New York City. It would have been extremely helpful if we could have had from the American Public Health Association a list of cities that had adopted similar ordinances and copies of such regulations.

Numerous other examples might be cited to illustrate the importance of setting up and keeping current this type of service and seeing that it really functions.

Model Public Health Ordinances—Another item which I think might be included in the committee's program is the development of model public health ordinances for states, cities, and counties. It may be argued that all states and communities will not require exactly the same ordinances. This is quite true. Nevertheless, suggested model ordinances would be exceedingly helpful as guides in drafting regulations to meet local needs. *The Model Milk Ordinance*, issued by the U. S. Public Health Service, has proved of great assistance to health officers when they were concerned with the drafting of a new milk ordinance for their city.

Evaluation of Administrative Procedures—A beginning has been made in the field of evaluating administrative procedures through the committee's studies of Prenatal Care, Scarlet Fever Control, and Diphtheria

Immunization, but there are many other fields which could be profitably explored. Such studies are time consuming and expensive; yet, on the other hand, it seems to me that the time has come when some attempt should be made to evaluate a number of administrative procedures which we have been carefully following for years without being sure of their real scientific value. The set-up of the committee lends itself admirably to the supervision of research work in this field, and this opportunity for a real contribution to the advancement of administrative practice should not be ignored.

Development of Qualitative Standards—Most of the criticism launched against the *Appraisal Forms* is that they measure quantity and not quality of service. This criticism is undoubtedly justified, although it is true that a number of items do measure quality, and in others it is implied. However, if progress is to be made in bringing about a wider acceptance of the appraisal idea and insuring a more lasting usefulness, the committee must consider introducing in future editions of the *Appraisal Forms* criteria that have a direct bearing on the character of service rendered. Furthermore, the whole question of relative importance of activities and their relationship to

the community health program should be carefully scrutinized.

More Published Reports — During the past few months the committee has issued a series of articles in the *American Journal of Public Health*, based on a study of Current Health Department Practices as reported through the Contests. These summaries provide informative data on health department expenditures and personnel. Further studies of this type with published reports of the findings should be a part of the committee's future program.

I am sure there are other health officers who, from their own experience and viewpoint, could add many helpful suggestions for increasing the usefulness of the committee.

Functioning as it does through some 14 sub-committees, the Committee on Administrative Practice offers splendid opportunities for active participation of alert and progressive public health workers in planning and carrying forward its activities. The notable success which has marked its work through the 15 years of its existence has been due in no small degree to the bringing into its service for consultation and advice men of wide experience and unbiased viewpoint. With a continuation of this policy, may I predict for the committee many years of satisfactory service.

Development of Vital Statistics in the Bureau of the Census*

HALBERT L. DUNN, M.D.

Chief Statistician, Division of Vital Statistics, Washington, D. C.

THE primary task which has faced the leaders of vital statistics in the United States for the last third of a century has been the development of the complete recording of births and deaths. In 1900 the United States was one of the few remaining countries in the realm of Western Civilization which contained large areas in which births and deaths were not registered. The difficulties facing the centralized development of vital statistics arose from the fact that the individual states were autonomous. In 1900 the Bureau of the Census, aided by the American Public Health Association, the state boards of health, and the American Medical Association, drafted a model law which the states were urged to adopt individually in order that the United States might attain a complete and uniform system of registration.

The success of the death registration area led to the establishment of a corresponding birth registration area. With the completion of both areas, by the admission of Texas in 1933, the first great task in the development of building an effective national science of vital statistics has become an accomplished fact.

In charting the course for continued advance in the field of vital statistics,

the first necessity was the creation of a new Division of Religious Statistics, General Information and Records, for the collection data not previously obtained by the Census Bureau. Dr. Murphy, formerly Chief Statistician of the Division of Vital Statistics, was asked to assume the leadership. It was felt that his invaluable knowledge of registration problems, gleaned by years of experience in the battle for a complete death and birth registration area, would do much to assure the success of this new division.

In the meantime, the Joint Advisory Committee to the Director of the Census surveyed the various questions and problems involved in charting a future course for vital statistics, worthy of the requirements of a nation such as ours—a course which might eventually result in the blazing of new trails for other nations to follow. The reorganization of the Division in accordance with the recommendations of the committee is now an accomplished fact, one with which you are all familiar.

The choice for the position of Chief Statistician for the Division was a direct result of the committee's recommendation which provided that, if possible, the chief statistician should be qualified as a physician and also as a scientist trained in the technics of biometry and interested in statistical research. The choice of Dr. Collinson for the position of Assistant Chief

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

Statistician was also a result of the committee's recommendation that the assistant chief statistician should be qualified as a physician and should also be familiar with the problems faced by the states in relation to public health as well as to vital statistics. I do not need to describe Dr. Collinson's work in connection with vital statistics and public health activities in Maryland, since he is known personally to those present at this meeting. Dr. Linder is another addition to the staff of the Division. His scientific training and publications in the field of biostatistics and psychology will materially strengthen the research activities of the Division.

The next important step taken by the Director of the Bureau of the Census was to ask for the appointment by the Secretary of Commerce of an Advisory Committee for the Division of Vital Statistics. This committee was appointed on July 29 by Secretary Roper. In the selection of the membership of the committee, an attempt was made to secure representation of leaders from among those who gather and use vital statistics.

The names of those asked to be members of the committee are as follows:

Prof. Robert E. Chaddock, Professor of Statistics at Columbia University

Louis I. Dublin, Ph.D., Vice-President of the Metropolitan Life Insurance Company

Haven Emerson, M.D., Professor of Public Health Administration at Columbia University

Lowell J. Reed, Ph.D., Professor of Biostatistics, School of Hygiene, Johns Hopkins University

Stewart G. Thompson, D.P.H., State Registrar of Vital Statistics in Florida

R. C. Williams, M.D., Assistant Surgeon General and Chief of Division of Sanitary Reports and Statistics, U. S. Public Health Service.

The first meeting of this Advisory Committee was held at the request of the Chief Statistician for Vital Sta-

tistics on September 20, 1935, in the Commerce Building at Washington, D. C. Dr. Reed was elected by the committee as its chairman, and Dr. Thompson, secretary.

The purpose of the meeting was to formulate a plan for the future development of the Division of Vital Statistics, Bureau of the Census. The committee came to the agreement that the future development of the Division should be extended along the following broad general lines:

1. Extension of field work in order to secure and maintain completeness in the registration of births and deaths, to improve the completeness and accuracy of the data noted upon the original certificates, and to promote coöperation between federal, state, and non-official agencies dealing with and interested in vital statistics.

2. Coördination of state and federal statistical office activities with the object of eliminating overlapping effort in so far as possible.

3. Development of means by which the total data in the birth and death certificate might be made readily available for special public health and scientific needs.

4. Stimulation of research within the Division by appropriate coöperation of the Division with outside scientific and public health agencies, and by building up within the Division a personnel whose principal duties will be the analysis and solution of important vital statistical problems.

EXTENSION OF FIELD WORK

The customary method of testing completeness in registration of births and deaths has been by the post card check. All states have entered the registration area only after they have passed a test in completeness of registration as indicated by post card check. It is necessary to maintain continued interest in the completeness of registration in order to create a general public consciousness of the need and value of complete registration of births and deaths. The post card method of survey undertaken with the permission and coöperation of the officials of the

state department of health is the most valuable mechanism for this purpose. A publicity campaign consisting of newspaper articles, lectures, visits to physicians, midwives, local registrars, undertakers, etc., is usually conducted as a preliminary step. It is essential that post card surveys be carried on in future even as they have in the past.

The information on the card dealing with birth consists of the factors—name of child, color, birth date, place of birth, name of parents, and address. The post card reporting deaths contains the name of decedent, color, date of death, place of death, name of informant, and address.

On the usual post card surveys this information is requested for those births and deaths which occurred during the previous 12 months. Through the courtesy of the Postal Service, one post card is sent to each family. All returned cards are checked in the state office of vital statistics against the index of births and deaths, or against the actual original certificates of births and deaths. By this means the percentage completeness of births and deaths previously recorded by the state or city registrar can be evaluated in terms of the number of births or deaths reported on the post cards.

Other methods of survey to ascertain the completeness of registration have been used, of which the principal one is that of enumeration. This method, admittedly more accurate than the post card survey, is considerably more expensive. For reasons of economy, the post card method must ordinarily be used. Its accuracy however, should be checked with that of the enumeration method from time to time. One such test has been conducted this year in the State of Georgia, and it is hoped that other comparisons of a like nature can be obtained in the near future.

There are other aids to complete registration. In all state offices cer-

tificates of death of children under 1 year could be checked against records of births to determine if the birth has been reported. This is a very simple process and can be carried out as a routine monthly office procedure. Whenever school authorities take the census of school and preschool children, the information from these schedules can be used to determine if births have been registered completely. Assistance in checking the completeness of registration can be obtained by comparison of state files with information concerning births and deaths taken from lists reported by hospitals, physicians, or undertakers. In isolated and backward areas information on births and deaths can be obtained from church records. In the registration of Indians, whether on or off government reservation, considerable gain can be made by closer coöperation with the Office of Indian Affairs.

In addition to the necessity of vigilance in maintaining completeness of registration of births and deaths, it is hoped that attention can be focused in the future upon the problem of obtaining greater completeness and accuracy of the contents of the birth and the death certificates. This is for the most part an experimental problem to be solved by special studies.

The necessity of stimulating promptness in the transmission of birth and death certificates from the local areas to the state office and from the state offices to the Vital Statistics Division of the Census Bureau is another field problem involving primarily a closer coöperation between this Division and the state offices of vital statistics.

The Division of Vital Statistics has obtained authorization for 6 medically trained field workers who will assist in the solution of these manifold problems. In the course of a year an agent would presumably work in a number of states. He would be a representative of this

Division in coördinating federal with state activities, and at the same time would serve as a medium for exchange of ideas between states.

The Division hopes to continue the regional conferences of state registrars which have proved to be of great benefit in coördinating the activities of federal and state divisions of vital statistics. Attendance at local, state, and national meetings, and visits to the states by the officials of this Division will be an additional aid in the interchange of ideas and the maintenance of a spirit of coöperation.

COÖRDINATION OF FEDERAL AND STATE OFFICE ACTIVITIES

The Division of Vital Statistics is cognizant of the extensive overlapping in activities which exists at present in the state and the federal offices of vital statistics. Both offices code the death and birth certificate completely with a consequent loss in the effective use of the clerical personnel in the respective offices. It is the desire of the Division to eliminate such overlapping activities in so far as possible. The function of the field worker in connection with this process will be invaluable. Each field worker will be trained in the practices of the U. S. Division of Vital Statistics. Consequently when he is working with the state registrars, he will be able to help in the coördination of the office activities of the state and federal divisions.

As a prerequisite to coördination of office activities, a loose-leaf instruction manual is being prepared by this Division. This manual will describe minutely every process involved in coding and punching of the information from the birth and the death certificate on the 45 column punch card which was adopted by the Division on July 1, 1935. In addition to the detailed information on coding and punching, all variations in practices in-

involved with coding of causes of death will be incorporated as part of the instruction manual. The instruction manual will be distributed to all state registrars and to others who are interested in the procedure followed by this Division. No alterations in the rules announced in the instruction manual will be made except by officially approved amendments. Such amendments will be furnished to those on the mailing list to whom the instruction manual is distributed. It is hoped that a precise written presentation of the practices of this Division will aid materially in bringing state and federal office practices into harmony.

Perhaps the one factor which is the greatest barrier in obtaining this goal is the coding of causes of death. The difficulties involved in the selection of the primary cause of death by use of the *Manual for Joint Causes of Death* are particularly complex and bewildering.

A letter was sent to the state registrars on August 30, 1935, soliciting their coöperation in a study of this question. Enthusiastic response indicated the urgency of obtaining simplification of the exceptions which have been made in the exact use of the *Manual of Joint Causes of Death*. Instructions to coders of causes of death will be included as a part of the instruction manual. The state registrars may rest assured that the rules for coding cause of death will be strictly adhered to by the Division of Vital Statistics, and that any alterations will be made only after approved amendments have been distributed to all.

The Division of Vital Statistics, acting upon the advice of its Advisory Committee, expects to study the effect which multiple causes of death have upon the method of selection of the primary cause of death by use of the *Manual of Joint Causes of Death*. With such knowledge, it will be pos-

sible to obtain an understanding of the death rates which are computed by using the primary cause of death. It is particularly desirable that such a study of the primary or contributory cause be available in connection with maternal deaths, and consequently it is anticipated such analysis can be made upon the 1935 death certificates.

GREATER AVAILABILITY OF TABULAR DATA FROM THE BIRTH AND DEATH CERTIFICATES

At present the measure of public usefulness of the Division of Vital Statistics is represented largely by tabulations which are made from the data under its jurisdiction. In the past such tabulations have been concentrated for the most part in the volumes of mortality and birth statistics. In the future it is hoped that progress can be made which will make available more extensive tabular information than exists in the printed volumes. This will be achieved by the following:

A. Making available in depository libraries tabulations which can be printed only in limited editions by mimeographic or photographic printing processes.

B. Tabulating many special tables which will be held in manuscript in the central office. A list of all such tables which can be photostated upon demand will be published.

C. Summarizing the data of individual certificates of birth and death upon summary punched cards which will make possible upon demand and with a minimum of clerical effort, unusual and manifold kinds of tabulations.

A summary card set-up signifies what the name implies; *i.e.*, a secondary set of punched cards which summarize the data for a given community and cause of death. When the data of given communities are summarized upon punch cards, the data can be recompiled with very little effort by passing the summary cards of those communities through the tabulating machinery.

It is hoped that some such plan can be devised in the immediate future so that demands for special data by public health officials or by scientists involved with specialized research interests can be answered without delay.

It is important to note that the total data on the birth and the death certificate are not completely transferred to the punched card. It is vital to the continued development of the Division that it have access to all the data on the certificates. For example: the problem of studying the effect of multiple causes of death upon the selection of the primary cause of death by the use of the *Manual of Joint Causes of Death* could not have been studied in 1935 if the detailed information upon the death certificate were not available to this Division. Likewise the study of multiple causes of death in connection with puerperal deaths could not be carried through without having access to the original certificates. Consequently, the elimination of overlapping activities between state and federal vital statistical offices should not preclude the ability of the federal Division to obtain the complete information on the original birth and death certificate.

DEVELOPMENT OF RESEARCH

In the past special studies by the federal Division have been made occasionally upon request from special organizations. Monographs have been published under the sponsorship of the Division. It is hoped that in the future a considerable amount of clerical effort, devoted at the present time to tabulation, can be released by the use of a summary punched card set-up. If this can be achieved, the time of this clerical personnel can be allocated to the functions of computation and research. The necessity for greater activity by the Division along these lines is obvious. Special study is

needed in connection with the relation of births and deaths to population and the estimates of population in intercensal years. The degree of reliability of the Division's own work is also a function for divisional research. The numerous problems involved in the allocation of death and birth by residence will be faced. Residence as well as place of death will be coded and punched on all 1935 mortality and nativity cards.

In conclusion, may I express the appreciation of the members of the

Special Advisory Committee of the Division of Vital Statistics as well as that of the Director of the Bureau of the Census and the officers of the Division of Vital Statistics for the spirit of coöperation which has been evidenced in these early months of reorganization. By joining hands with the state registrars of vital statistics and the state health officers, it is within the power of the United States to win a position in the world of vital statistics which is second to that of no other nation.

St. George, the Patron Saint of Lepers

THE legends and stories about Saint George (St. Georg, St. Jörgen) are many. The Near East, as well as England, Aragon and Portugal claim him as their patron saint. Living in the 3rd century, he belonged rather to the Christian Church as a whole than to any locality. The Catholic Church, the Anglican Church, the Greek Church, the Syrian Church, and even the Mohammedans revere him. Central Europe, too, has its legends concerning him. . . .

An old German picture from the Middle Ages illustrates the story of St. George killing a dragon with a spear. This story is found in the Golden Legend by Jacobus de Voragine, and resembles a Christianized form of the ancient legend of Perseus slaying the sea monster to save Andromeda, or of the sun god as the conqueror of darkness. More recent crusaders against leprosy have revived

the legend and refer to St. George as fighting leprosy, the dragon destroying the health of the Middle Ages. This idea has some historic significance, since in that period St. George was honored already as the patron saint of lepers, and an order named after him, the Knights of St. George, took much interest during the Middle Ages in nursing lepers.

The Second International Leprosy Conference, held in 1909 at Bergen, Norway, under the secretarial supervision of Dr. H. P. Lie, used the old legend in its emblem, and in 1932 the International Leprosy Association adopted a slightly modified form of this emblem as that of the new organization. Thus we see legends live on, modifying their forms as time and circumstances demand. . . . Lee S. Huizenga, M.D.—*International Journal of Leprosy*, pp. 337-338.

National Aspects of the Social Security Program as They Pertain to the Children's Bureau *

KATHARINE F. LENROOT

Children's Bureau, U. S. Department of Labor, Washington, D. C.

IT is a privilege and an honor to participate in the Sixty-fourth Annual Meeting of the American Public Health Association, an organization which through the years has contributed so much in inspiration, illumination and guidance to the great objective of protecting and advancing the health of the people.

It was logical and highly appropriate that measures for strengthening and extending the public health services and the special services for the health and welfare of mothers and children should be incorporated in the National Social Security Program recently authorized by Congress. Throughout the ages war, pestilence and famine have been the great specters under whose shadows men have built homes and women have borne and reared children. Civilization is still at grips with war, whose power has been vastly augmented by science. In the Western World we no longer speak of pestilence, though we are no less vitally concerned with forces menacing life and health, and we have translated famine into unemployment and economic depression.

It is unnecessary to emphasize in this

gathering the close relationship between conditions which shorten life and drain body and mind of strength and vigor, and conditions undermining economic welfare. Illness has long been recognized as one of the major causes of that poverty which persists in times of prosperity as in times of depression. Moreover, as shown by studies made by the U. S. Public Health Service in coöperation with the Milbank Memorial Fund, the incidence of sickness appears to be greatest in families whose standards of living are seriously and somewhat suddenly reduced. Long before the depression which put 8,000,000 American children under the age of 16 years on the relief rolls, the toll which poverty and economic exploitation took of the lives and welfare of children was known to be severe. The earliest studies of the Children's Bureau, dealing with infant mortality in representative industrial cities, showed that low earnings and high infant mortality rates went hand in hand. Juvenile delinquency is one manifestation of the absence of mental and social health, and there is evidence indicating that areas in our large cities having high delinquency rates also have high infant mortality rates and high incidence of communicable disease.

Security in our childhood was a creation of the family and its circle of

* Read at a Special Session under the auspices of the Health Officers Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

relatives, friends, and neighbors, with few outer guarantees. Death, illness, accident, poverty, unemployment, were individual calamities for which society made only the most meager provision. With the developing prosperity of the new century and the increasing awareness of the public of the need for community provision for health and welfare, both public and private resources for the prevention and care of illness and social distress multiplied, and great organizations of men and women lent effective support to these movements. Yet in spite of national influences expressed through federal and voluntary organizations and considerable gains in state legislation and administration, progress on the whole was uneven, varied greatly from state to state and within areas of the same state, and left large numbers of men, women, and children almost entirely outside the reach of the developing concepts of social responsibility and social protection.

Thus we came to the cataclysm of 1929 and the succeeding years, which shattered the security of the most self-confident and awakened us to widespread realization of the need to remold our economic and social life so as to afford more adequate safeguards for individual and family activities and growth. The development of policies designed to afford such safeguards has included financial, agricultural, industrial, relief, public health, social welfare, and other measures related to social well-being. The Social Security Act, approved August 14, 1935, after a year of study by the Cabinet Committee on Economic Security headed by the Secretary of Labor, and experts associated with it, is concerned with one of the major aspects of security outlined by the President in his message of January 4, 1935—"Safeguards against misfortunes which cannot be wholly eliminated in this man-made world of ours."

The Act, which, as you know, includes provision for unemployment compensation, old-age security, security for children, aid to the blind, extension of public health services, and vocational rehabilitation, is based primarily, with the exception of the titles dealing with old-age benefits, upon coöperative federal-state relationships. Its philosophy, as stated by the Secretary of Labor in her address to the Second National Conference on Labor Legislation, is that of "mutuality and coöperation." Concretely, this philosophy is expressed in coöperative relationships to be developed between the federal government and the states; the states and local government units; the official agencies within these areas of government concerned with health, education, and public welfare; and the official agencies and representatives of voluntary groups such as medical societies, public health nursing organizations, other health groups and organizations, and social welfare agencies. As a foundation for all these professional undertakings the understanding and intelligent support of great lay groups of citizens are essential. The Social Security program can be carried out only as it becomes in each state a state-wide program, clothed with specific provision for making it effective in the lives of the men, women, and children of the state, and supplemented by such other measures of social provision for human needs as experience shows to be necessary and feasible.

The Cabinet Committee on Economic Security and the committees of the House and the Senate which gave extended consideration to the Social Security proposals concurred in recognizing that the core of any social program is the child; that all parts of the Act are in a very real sense measures for the security of children; but that "in addition," in the words of the Senate Finance Committee, "there is

great need for special safeguards for many underprivileged children." The Cabinet Committee had in mind the millions of children under the age of 16 years in families receiving relief, of whom over 700,000 were in families without the presence of the normal breadwinner; the 280,500 children receiving benefits under the inadequate and uneven provisions for mothers' aid, now authorized by the laws of 46 states and the District of Columbia; the physically handicapped children numbering from 3 to 5 million; and many other classes of children receiving or in need of social protection.

The report also called attention to the economic loss and the insecurity for children resulting from the high rate of maternal deaths in the United States, and the inadequacy of prenatal and obstetrical care in both urban and rural districts. It emphasized the drastic reductions in state appropriations for maternal and child hygiene; the need for more adequate infant and child health service, especially in rural areas, where since 1929 infant mortality rates have exceeded the rates for urban areas; and the need for the development and extension of state and local programs for crippled children.

The special measures for the health and welfare of children incorporated in the Social Security Act constitute recognition of the fact that security and opportunity for children are dependent not alone upon family income but also upon parental intelligence and community provisions for the health and social services which individual families under modern conditions cannot provide by their own efforts alone.

Title IV of the Act provides for extending and strengthening state provision for needy dependent children in their own homes who have been deprived of parental support or care by reason of the death, continued absence from the home, or physical or mental

incapacity of a parent. The federal government will give aid to the states for this purpose, amounting in general to one-third of the cost of state plans approved by the Social Security Board, which is given administrative responsibility for this Title of the Act. The plans must provide for state-wide operation, must be mandatory upon local political subdivisions if administered by them, must be administered or supervised by a single state agency, must give opportunity for state review of claims denied, and must provide for efficient methods of administration. In a number of states it is necessary to amend state legislation and provide for state appropriations in accordance with the provisions of the Act, and some states have already taken such legislative action. In the development of this part of the program and of the child welfare provisions to be described later close relationships between the Children's Bureau and the Social Security Board will be maintained.

The Children's Bureau is given responsibility for the administration of Title V, except part 4 (section 531) authorizing additional appropriations for vocational rehabilitation services which are to be administered by the office already charged with this responsibility, namely, the Office of Education. The annual appropriations authorized to be administered through the Children's Bureau, under the general supervision of the Secretary of Labor, are as follows:

For grants to states.....	\$8,150,000
Maternal and child health services	3,800,000
Services for crippled children..	2,850,000
Child welfare services.....	1,500,000

An annual appropriation of \$425,000 is authorized to enable the Children's Bureau to carry on necessary administrative functions and to make such studies and investigations as are necessary to promote the efficient adminis-

tration of those portions of the Act for which the Bureau is responsible.

The primary purpose of these portions of the Act, as described in a bulletin, *Grants to States for Maternal and Child Welfare*, recently published by the Children's Bureau, is to extend and strengthen services for mothers and children in rural areas, in areas suffering from severe economic distress, and among groups in special need. These are the people who have been hitherto, for the most part, outside the reach of health and welfare services that have been more generally available in cities. In this connection it is interesting to note that whereas the urban infant mortality rate increased 1 point from 1933 to 1934 (from 57 to 58), the rural rate increased 3 points—from 59 to 62. Certain urban districts, however, still have exceedingly high rates, and programs to be developed by the states under the Act will reach some of these areas as well as the less populous portions of the country.

The amount of \$3,800,000 available for maternal and child health services as follows:

Uniform apportionment, \$20,000 to each state.....	\$1,020,000
Apportionment on basis of live births	1,800,000

These amounts, totalling \$2,820,000, are available for payment of half the total expenditure under approved state plans. In addition, \$980,000 is available for allotment by the Secretary of Labor in accordance with the financial need of each state for assistance in carrying out its plan, after the number of live births is taken into consideration.

The federal administration of this part of the Act has been placed under the immediate direction of a Maternal and Child Health Division in the Children's Bureau, headed by a physician and receiving general supervision from

the Assistant Chief of the Children's Bureau, Dr. Martha M. Eliot. State administration is vested in the state agency of health.

State funds appropriated or otherwise provided by the state itself must be made available for payment of part of the costs of approved plans. Funds appropriated or made available by political subdivisions (counties, cities, or towns) may also be counted, provided such local activities are brought into the state plan and under the general supervision of the state department of health. State or local funds used for matching any other federal appropriation cannot be counted in establishing eligibility for federal assistance under this portion of the Act.

Responsibility for initiating and developing state plans rests with the states. They are to be approved by the Chief of the Children's Bureau if they conform to certain conditions specified in the Act. These conditions include, in addition to provision of public funds as indicated earlier, provision for such methods of administration (other than those relating to selection, tenure of office, and compensation of personnel) as are necessary for the efficient operation of the plan, and such reports as may be required; and provision for extension and improvement of local maternal and child health services, for development of demonstration services in needy areas and among groups in special need, and for coöperation with medical, nursing, and welfare groups and organizations.

The general principles governing the portions of the Act relating to services to crippled children are similar to those governing maternal and child health services. The appropriation of \$2,850,000 is to be allotted, \$20,000 to each state and the remainder on the basis of numbers of crippled children in need of services and costs of furnishing services to them. Grants to the states must

be matched in full by state or state and local funds. Conditions which must be met before plans are approved include coöperation with medical, health, nursing, and welfare groups and organizations and with any agency in the state charged with administering state laws providing for vocational rehabilitation of physically handicapped children. The funds are to be used for the purpose of enabling each state to extend and improve, especially in rural areas and areas suffering from severe economic distress, services for locating crippled children and for providing medical, surgical, corrective, and other services and care, and facilities for diagnosis, hospitalization, and after-care for children who are crippled or who are suffering from conditions that lead to crippling. The funds provided are not available for the education of crippled children.

The administration of this part of the Act will be under the immediate direction of a Crippled Children's Division of the Children's Bureau, headed by a pediatrician with special experience in the development of community programs for crippled children, and receiving general supervision from the Assistant Chief of the Children's Bureau. State administration will be through a state agency having responsibility for medical care for crippled children. If several agencies are responsible, one should be designated by agreement of those concerned.

The appropriation of \$1,500,000 for child welfare, to be allotted \$10,000 to each state and the remainder on the basis of rural population, is to be available for coöperation with state public welfare agencies in establishing, extending, and strengthening, especially in predominantly rural areas, public welfare services for the protection and care of homeless, dependent, and neglected children, and children in danger of becoming delinquent. They

are to be used for payment of part of the cost of district, county, or other local child welfare services in areas predominantly rural, and for developing state services for the encouragement and assistance of adequate methods of community child welfare organization in areas predominantly rural and other areas of special need. The program will be under the immediate direction of the Child Welfare Division of the Children's Bureau, headed by a social worker.

Because of the failure of Congress to pass the Third Deficiency Appropriation Act, the program, which it had anticipated would be fully under way by this time, is still in the planning stage. Fortunately, relatively little state legislation is required to enable the states to coöperate with the Children's Bureau, provided state funds, supplemented by local funds, can be made available for the coöperative activities authorized.

The Secretary of Labor, on the recommendation of the Children's Bureau, has appointed 4 advisory committees to assist the Children's Bureau in the development of general policies. These committees, whose membership will be announced shortly, include representatives of various branches of the medical profession, public health nursing and social services. They are as follows: General Advisory Committee on Maternal and Child Welfare Services, Maternal and Child Health Advisory Committee, Advisory Committee on Services to Crippled Children, and the Child Welfare Advisory Committee. The committees will probably be called together within the next 2 months.

The Children's Bureau has appointed persons to have charge of the development of the work of the 3 divisions responsible for the coöperative activities under the Social Security program, and has assigned a few physicians and social workers as field representatives,

available for advisory services desired by the state agencies in connection with the development of state plans. It is hoped that such progress can be made in the development of plans in many states that they can be approved by the time appropriations become available, so that payments of the first grants can be made promptly. The Bureau will endeavor to give information and assistance to the states, so that the experience of the best will be made available to all, the children thus being afforded the maximum service possible. Studies and investigations will be undertaken in coöperation with state agencies in order to afford a sound basis for the development of various aspects of the program.

Administration of the three types of aid for maternal and child health and welfare will be closely integrated, for we have learned that it is impossible to divide a child's life into separate compartments; physical and mental health are mutually interdependent. The care of the crippled child is an excellent example of the need for coördination of medical, nursing, and social services. Locally, much of the work of locating and diagnosing crippled children will be carried on through maternal and child health services; nurses will assist in follow-up after discharge from hospitals; and social workers will assist in determining financial need, developing plans for boarding or institutional convalescent care, and preparing the family for the child's return. Mental hygiene services should be developed, as opportunity offers, in connection with both the health and the welfare programs.

Although specialized direction of the services planned will be given by 3 divisions in the Children's Bureau, a unified program of field service is being developed. The same physicians will be available for consultation service to the states for both the maternal and

child health and the crippled children's programs, the same public health nursing consultants for both programs and probably the same social workers for the crippled children's and child welfare programs. Close coöperation among the various federal agencies concerned in the Security program will be maintained.

Locally, a broad base of county or district public health service and social service is essential. The maternal and child health program must be developed as part of a generalized service, with specialized consultant service provided. In many areas similar relationships between specialized and generalized social services will be developed. Both generalized service and specialized service, at least of an advisory nature, are necessary if the needs of mothers and children are to be met.

The success of the undertaking will be dependent chiefly upon the extent to which the state coöperating agencies can be equipped with qualified personnel and leadership. State and local services immune from political interference, staffed with people qualified by training and experience for the work to be undertaken, and working with the full coöperation of professional and lay groups, are essential.

The facilities provided by the Act will not relieve private health or social welfare agencies of any responsibility they are now carrying. The need for generous support of private agencies will be as great as ever. Most of the services provided for mothers and children and for crippled children will be entirely outside of the large cities.

In the development of both the maternal and child health and the crippled children's programs, the understanding and coöperation of the medical profession and of specialists in public health administration are of the utmost importance. Questions involving medi-

cal relationships will be dealt with by national and state advisory committees on which the medical profession will be represented. The Children's Bureau will advise the states that evidence that medical and health groups have been consulted and are coöperating must be included in plans for state and local activities. We shall look to the members of the American Public Health Association for counsel and for assistance in placing these programs upon a secure foundation.

These activities, together with others developed through federal, state, and local participation and the coöperation of voluntary groups, will help to extend to the entire nation such safeguards as are necessary for the general health and well-being. Through them, families and communities will be strengthened in their ability to provide for their children that security and opportunity for satisfying living and achievement which is in harmony with our highest ideals.

Annual Report of Montefiore Hospital

THOSE who are interested in promoting public understanding of the place and utility of great hospitals will be fascinated by a popular edition of the Annual Report of Montefiore Hospital in New York City. The booklet is entitled, "Fannie Hurst's Visit to Montefiore," and in a very clever fashion the author has made the hospital seem a human place where, "in spite of the scientific evidence, the tremendous medical achievement, the equipped laboratories, and the high powered minds behind the façade of Montefiore, a warm human atmosphere

radiates." "It must suffice to say that by some subtle and blessed technic a hospital has become a humane as well as a human enterprise."

Fred M. Stein, Member A.P.H.A., is President of Montefiore. The hospital is a member of the United Hospital Fund in New York which is at present having an annual campaign. The booklet is beautifully illustrated with hospital scenes, and might prove an inspiration to some health department to humanize the figures which make up the ordinary health department reports.

Present Status of the Vitamin B Complex*

C. A. ELVEHJEM, PH.D.

University of Wisconsin, Madison, Wis.

IN the report¹ on "Human Requirements for Vitamins" given by your committee on nutritional problems at the annual meeting in Pasadena, only vitamin B and the antipellagric factor were included in the vitamin B complex. A survey of the recent literature makes it very evident that we must deal with more than 2 factors. Results have been obtained which indicate that the older factors are of multiple nature. Most investigators also seem inclined to include newly discovered factors in this group. It is unfortunate that factors which are not abundant in yeast and which are not readily soluble in water should be referred to as part of the B complex, but the reason is undoubtedly that a realization of their existence came with studies on vitamin B₁ or B₂.

The magnitude of the literature and the number of individual factors to be discussed is probably discouraging to those who are interested mainly in practical nutrition. However, I feel that we should be encouraged, for it is indicative that we are learning more about the constituents of our food and that we are making available more weapons to combat deficiency diseases. The greatest difficulty encountered in the study of the B complex is the lack of satisfactory methods for the assay of the factor in question. The prop-

erties of the water soluble group are so similar that any method for the elimination of one of the factors in a purified ration tends to remove all the factors, and concentrates to furnish one factor are apt to contain appreciable amounts of others. Much confusion has also arisen due to reliance entirely upon growth experiments. It is true that if an animal fails to grow on a purified ration, and a certain concentrate increases the rate of growth, we are dealing with an essential nutrient, but it is difficult to be certain that one specific factor is being dealt with. Greatest progress will be made when specific pathological symptoms can be produced in experimental animals for each of the factors.

With these limitations in mind I wish to list the factors which may be included in this group and discuss briefly the more important ones.

VITAMIN B₁

There has been a renewed interest in the assay of food materials for vitamin B₁ mainly because it has been realized that earlier determinations were complicated by the absence of other essential factors and because an international unit for vitamin B₁ has been established. Birch and Harris² have shown that vitamin B₁ is specific for the cure and prevention of bradycardia in rats and have used this method for assay work. We have found the prevention of polyneuritis in chicks fed an autoclaved natural grain diet to be very satisfactory for the

* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

estimation of vitamin B₁. The relative potency of materials fairly high in vitamin B₁ may not be changed much by improved methods of assay. However, foods rich in other growth factors will undoubtedly show a lower potency when assayed by methods involving prevention of polyneuritis. This is especially true in the case of liver since we have found heart muscle, kidney, and even pork skeletal muscle to be richer in this vitamin than liver. Foods low in other components of the B complex will probably show a greater vitamin B₁ content. Yeasts when properly tested show a greater variation than is generally supposed. We have found brewer's yeast to be 12 to 16 times as potent as some samples of baker's yeast. It may also be necessary to reconsider the destruction of this factor during the canning process. Results in our laboratory show that 50 to 75 per cent of the vitamin B₁ in meat products is destroyed during the canning process.

Eventually the potency of foods will be expressed in terms of crystalline vitamin B₁. However, as yet there is no agreement concerning the relation of the potency of the vitamin crystals to the international standard. Ohdake³ has reported that 1 gamma of his crystals is equal to 1 international unit. Ammerman and Waterman⁴ found that it required 5 gammas of Williams's crystals to equal 1 international unit. In our work with chicks we found 1 international unit to equal approximately 3 gammas of the Ohdake crystals.

The very recent results of Baker and Wright⁵ who used the method of Birch and Harris remind us again that vitamin B₁ is not abundant in most of our foods. Most of our fresh foods contain about 1 International unit per gram. Certain samples of yeast may run 30 to 40 units, but most of the yeast contains 10 or less units per

gram on the dry basis. Wheat germ and the embryo from other seeds run from 10 to 20 units. Pork muscle may contain as high as 8 units per gram on the dry basis or 2-3 on the fresh basis.

Cowgill⁶ has prepared a formula for the calculation of the vitamin B₁ requirement of man based on body weight. According to his figures a 70 kilo man requires about 6,000 mg. equivalents or 300 International units per day. Of course, a number of factors, such as ability to assimilate the factor from the food, body reserves, etc., will affect the requirement. The availability now of crystalline vitamin will be of great help in the treatment of certain severe cases of B₁ deficiency. The exact chemical constitution of B₁ is still unknown, although Williams and his coworkers have demonstrated the presence of 2 groups in the molecule, namely, 6 amino pyrimidine and a thiazole ring.

The physiology of B₁ activity is extremely interesting. There seems to be good evidence that it is concerned with some part of the oxidative mechanism in carbohydrate metabolism, especially in the metabolism of pyruvic acid. It is now evident that its function is not limited to the brain but that it acts on other tissues as well.

VITAMIN B₃

The existence of a factor having properties similar to those ascribed to vitamin B₃ seems quite probable. This factor was first postulated by Williams and Waterman⁷ as necessary for the growth of pigeons. Waterman and Ammerman⁸ have shown very recently that, although 3 gamma of vitamin B₁ crystals will cure the polyneuritis in pigeons fed an autoclaved wheat diet, increased amounts (as high as 160 gammas) give further increments in weight. The same workers⁹ have reported similar results in the case of rats on synthetic diets. It is entirely

possible that vitamin B₃ is also operative here since there is no reason to believe that rats and birds require different factors. In our laboratory we have found that chicks produced at certain periods of the year and fed autoclaved ration plus B₁ crystals develop severe gizzard lesions similar to those described by Dam and Schönheyder¹⁰ in chicks reared on synthetic diets. This condition was prevented by addition of unautoclaved natural foods. The stability of this factor is therefore similar to that of vitamin B₃. The importance of this factor in human nutrition cannot be discussed without further work, but if it is essential, it may be of equal importance with B₁ because it is so readily destroyed by heat and moisture.

VITAMIN B₄

In 1929, Reader¹¹ demonstrated the existence of an additional factor in the B complex which was finally designated as B₄. At first its existence was based on subnormal growth in rats receiving a B low ration plus adequate amounts of B₁ and B₂, but later definite pathological symptoms were described. Reader¹² gives the following symptoms: general muscular weakness, spastic gait, swollen paws, and a tendency to sit in a hunched position. In a later paper, Barnes, O'Brien, and Reader¹³ state that lack of coördination is the most marked symptom. Halliday¹⁴ has reported similar symptoms in rats and found the preventive factor in wheat.

Two years ago Keenan, Kline, Elvehjem, and Hart¹⁵ described a typical paralysis in chicks placed on a simplified diet of casein, dextrose, salts, yeast, and cod liver oil. The paralysis is characterized by lack of proper coördination and extreme difficulty in locomotion. Liver, brain tissue, and fresh grass were found to supply the lacking factor. Due to the similarity

of the properties of the factor necessary for chicks and that described by Reader we concluded that we were dealing with B₄.

Pappenheimer and Goettsch,¹⁶ in 1931 described a cerebellar disorder in chicks reared on simplified diets. It is quite probable that the condition is related to the B₄ deficiency we have described in chicks. The clinical behavior is very similar, and we have found pathological changes in the brain similar to those described by Pappenheimer and Goettsch.

The studies on B₄ have not been extensive enough to learn much about its properties. Preliminary work has shown that it is water soluble and very labile, especially in the presence of oxygen. It seems to be associated with the fat fraction under certain conditions but can be extracted from the fat by water. Barnes, O'Brien, and Reader¹³ described the isolation of active crystals but the crystals were essentially adenine hydrochloride. Since adenine itself is inactive, the action of their crystals must have been due to the presence of active impurities. It is interesting that considerable adenine is obtained in the final stage of the B₄ concentration. The B₄ may be related to certain adenine nucleotides or nucleosides.

The physiology of B₄ remains entirely for future experimental study. However, it is quite probable that the factor will find an important place in human nutrition and in the treatment of certain brain disorders. The fact that this vitamin is not abundant in most foods and is so easily destroyed may make it one of the more important factors in the B complex.

VITAMIN B₅

Carter, Kinnersley, and Peters¹⁷ have termed a factor necessary for maintenance nutrition in the pigeon vitamin B₅. They concluded that it

could not be identical with B₃ or B₄ because it was stable to an alkaline heating that would destroy these factors. Since it is now known that vitamin B₂ consists of more than one factor and since it is also known that birds as well as rats require vitamin B₂, the status of vitamin B₅ needs reinvestigation.

VITAMINS B₂ AND B₆

Although there is considerable controversy in the literature concerning vitamin B₂, the majority of the workers have used this term to designate the antipellagic or antidermatitis fraction of the B complex. Goldberger and Lillie¹⁸ described in 1926 the successful production of pellagra-like symptoms in rats, but most workers have encountered difficulties in the uniform production of dermatitis. The potency of the material assayed is generally based upon the rate of growth in unit time. Several workers have reported a lack of correlation between the failure of growth and the incidence of pellagra, but in spite of these observations the rate of growth has continued to be used as an index of potency.

In 1930, Norris and Ringrose¹⁹ described the production of pellagra-like symptoms in chicks. Two years later Kline, Keenan, Elvehjem and Hart²⁰ demonstrated the uniform production of similar symptoms in chicks reared on a natural grain ration heated dry at 100° C. for 144 hours. When this method for vitamin B₂ assay became available, Koehn and I turned our attention to the isolation of B₂. In the spring of 1933 we had obtained a concentrate which showed a distinct greenish fluorescence and was highly active in the prevention of pellagra in chicks. At that time the first paper by Kuhn, György, and Wagner-Jauregg²¹ on ovoflavin and the vitamin B₂ activity of this pigment became available to us. An attempt was

made, therefore, to incorporate part of the method used by these workers into our procedure. However, all preparations of flavins and lumiflavin from liver extract proved to be inactive in the prevention of pellagra. Finally, it was demonstrated²² that while the flavin was adsorbed on fuller's earth in an acid solution, the factor preventing pellagra in chicks remained in the filtrate. Upon further purification of the filtrate a practically colorless concentrate was obtained which proved active. In other fractions the flavin was removed by converting it to the lumiflavin and extracting it was chloroform without reducing the activity appreciably. The fluorescence due to the flavins in concentrates from liver extract was destroyed by exposure to sunlight or artificial light without altering the activity. Thus, the factor necessary for the prevention of pellagra in chicks is a chemical entity separate and distinct from hepatoflavin.

This introduces a very important question of nomenclature. The German workers have used vitamin B₂ synonymously with flavins without reservation. The constitution of flavins has been determined and a flavin identical with the naturally occurring one has been synthesized.^{23, 24} It is true that Kuhn and his coworkers and others have obtained increased growth in rats by the addition of flavins to the Borquin-Sherman diet, which was devised for vitamin B₂ assay. However, improved growth could be demonstrated only after the addition of extracts from yeast treated with fuller's earth to remove the flavins. It is now clear that an extract prepared from yeast in this manner still retains its antipellagic properties.

Since these workers have used only growth in rats, and we have used growth in rats, and in chicks for symptoms of pellagra, it seems logical to use B₂ for assay, the factor remaining in the filtrate after

removal of the flavins. Of course, it is necessary to demonstrate that the pellagra in chicks is similar to the pellagra in humans before this term can be accepted without reservation. We have now produced black tongue in dogs, which most workers believe to be identical with human pellagra, and have found that flavins are completely inactive in the cure of this condition while the filtrate remaining after the removal of the flavins gives immediate alleviation of the symptoms and promotes normal growth on Goldberger's diet.

Very recently three independent groups of English workers reported results which are in complete agreement with our conclusion that flavins and the antipellagic factor are two distinct factors. Chick, Copping, and Edgar²⁵ found that the addition of hepatoflavin or lactoflavin to a basal diet deprived of B₂ restored the growth in rats to a small extent but was without effect on the characteristic florid dermatitis. The supplementary substance obtained from yeast extract had no effect in restoring growth but had a slight curative effect on the dermatitis. When the flavin and supplementary material were given together, growth and cure of the dermatitis resulted. György²⁶ found lactoflavin to have no connection with the pellagra-like dermatitis in 211 rats. He also found a combination of the flavin and a supplementary substance necessary for normal performance. He prefers to continue to use B₂ for flavins and introduces a new term vitamin B₆ for the supplementary substance. Harris²⁷ also found flavins to have no antipellagic action. He suggests that be used for the complex and that no names should be given the several constituents.

Since vitamin B₂ has always been associated with human pellagra and since we have shown that the flavin-free fraction from yeast extract will cure

black tongue in dogs, which is accepted as the analogue to human pellagra, we prefer to retain vitamin B₂ for the antipellagic factor. Flavins, which are undoubtedly essential in nutrition, need not be designated by a letter because their chemical constitution is now known. At least the designation may be delayed until the exact function of flavins is known. Other factors may be part of this complex because György²⁷ has recently indicated that his B₆ is not identical with the antipellagic factor.

CONCLUSION

In conclusion we may say that the so-called vitamin B complex consists of at least 5 factors, B₁, B₂, B₃, B₄, and flavins. Much more work is necessary before we can speak definitely about the amount of these factors needed in the human diet and the use of these factors in the control of specific deficiencies. Our ideas concerning this group of vitamins will undoubtedly be changed to some extent by next year, but I hope that my brief survey will give you some idea of our knowledge of the vitamin B complex as it now stands.

REFERENCES

1. Report of the Committee on Nutritional Problems. *A.P.H.A. Year Book for 1934-1935*, p. 69.
2. Birch, T. W., and Harris, L. J. *Biochem. J.*, 28:602, 1934.
3. Ohdake, S., and Yamagishi, T. *Bull. Agri. Chem. Soc., Japan*, 11, 1, 1935.
4. Ammerman, M., and Waterman, R. E. *J. Nutrition*, 10:25, 1935.
5. Baker, A. Z., and Wright, M. D. *Biochem. J.*, 29:1802, 1935.
6. Cowgill, G. R. *The Vitamin B Requirement of Man*. Yale University Press, New Haven, 1934.
7. Williams, R. R., and Waterman, R. E. *J. Biol. Chem.*, 78:311, 1928.
8. Waterman, R. E., and Ammerman, M. *J. Nutrition*, 10:161, 1935.
9. *Ibid.*, 10:35, 1935.
10. Dam, H., and Schönheyder, F. *Biochem. J.*, 28:1355, 1934.
11. Reader, V. *Biochem. J.*, 23:689, 1929.
12. *Ibid.*, 24:1827, 1930.
13. Barnes, H., O'Brien, J. R., and Reader, V. *Biochem. J.*, 26:2035, 1932.
14. Halliday, N. J. *Biol. Chem.*, 106:29, 1934.
15. Keenan, J. A., Kline, O. L., Elvehjem, C.

- A., and Hart, E. B. *J. Biol. Chem.*, 103:671, 1933.
 16. Pappenheimer, A. M., and Goettsch, M. J. *Exper. Med.*, 53:11, 1931.
 17. Carter, C. W., Kinnersley, H. W., and Peters, R. A. *Biochem. J.*, 24:1832, 1930.
 18. Goldberger, J., and Lillie, R. D. *Pub. Health Rep.*, 41:1025, 1926.
 19. Norris, L. C., and Ringrose, A. T. *Science*, 71:643, 1930.
 20. Kline, O. L., Keenan, J. A., Elvehjem, C. A., and Hart, E. B. *J. Biol. Chem.*, 99:295, 1932.
 21. Kuhn, R., György, P., and Wagner Jauregg, T. *Ber. d. deutsch. chem. Gesellsch.*, 66:576, 1935.
 22. Elvehjem, C. A., and Koehn, C. J., Jr. *J. Biol. Chem.*, 108:709, 1935.
 23. Kuhn, R., and Weygund, F. *Ber. d. deutsch. chem. Gesellsch.*, 67B:2084, 1934.
 24. Karrer, P., Euler, H. v., Malmberg, M., Schopp, —, and Benz, F. *Svensk. Kem. Tids.*, 47:99, 1935.
 25. Chick, H., Copping, A. M., and Edgar, C. E. *Biochem. J.*, 29:722, 1935.
 26. György, P. *Biochem. J.*, 29:741, 1935.
 27. Harris, L. J. *Ibid.*, 29:776, 1935.

Research

RESEARCH is mainly looking for things that are not there and attempting processes that will not occur. The layman has little notion of this. Experimental science is tireless fumbling and groping, or the laborious discrimination and comparison of detail. It is subject to innumerable disappointments in following trails that lead out into a boundless desert or up against barriers that it seems

hopeless to try to scale. For the scientist does not make his own landscape, as do the poets, and even many philosophers, nor can he fly hither and thither at will, but he subjects himself to the tyranny of the natural phenomena or processes that he is observing. As Bacon says, he works "according to his stuff and is limited thereby."—James Harvey Robinson, *The Humanizing of Knowledge*, 1924.

Vitamin Content of Important Foods in the Child's Diet*

* CARL R. FELLERS, PH.D., F.A.P.H.A. (*Life Member*)

Nutrition Laboratory, Massachusetts State College, Amherst, Mass.

MOTHERS of today are food conscious. They are well aware that the foods which they give their children must be adequate not only in quantity but in quality. Through the continuous activity of many public health educational organizations, the true health story of foods and diets has gradually enlightened American parents as to the nutritive requirements of their children. Newest to arrive upon the scene of food essentials, are the vitamins. Mysterious and intangible at first, these elusive yet vital substances have at last yielded most of their secrets to chemists and physicians. The functions of each vitamin are now well understood and vitamin therapy is on a sound footing.

However, there has been much public misinformation concerning them. Propaganda for this or that food product or pharmaceutical preparation, injudicious advertising and an avalanche of vitamin claims for numerous foods, particularly baby and children's foods, have made mothers and even physicians and public health officials skeptical and wary of all products and foods claiming to contain vitamins. Newspapers, magazines, radio and

semi-scientific lectures have all contributed to the confusion. As yet, few public health laboratories have seen fit to set up biological units to determine the vitamin potencies of the many preparations offered for sale in their jurisdictions. As a consequence, the public has had to rely on the truthfulness of manufacturers' claims. Of course, there has been a great deal of vitamin research carried on and reported in scientific journals, but much of this is still undigested for public consumption.

For these reasons, a short summary of some of our research findings at the Massachusetts State College on some foods of special importance to infants and children, may be of interest. Our data deal largely with vitamins C and D in milk, fruits, and vegetables, with some information on other vitamins. The methods used have been the standard U.S.P. biological assay techniques with the exception of some of our most recent work on vitamin C, which has been carried on by use of the titrametric method of Tillmans¹ as modified by Bessey and King.²

EXPERIMENTAL RESULTS

MILK

Milk is the universal food of babies and young children. It is our most nearly perfect food. Among the essential nutritive factors which are present in insufficient amounts are vitamins D

* Contribution No. 222, Massachusetts Agricultural Experiment Station. Read before a Joint Session of the Child Hygiene and Food and Nutrition Sections of the American Public Health Association, at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

and C, also iron, copper, and sometimes iodine. Because of the high incidence of rickets in this country nearly all public health officials and physicians have recorded themselves as favorable to the fortification of milk with vitamin D. The 3 ways by which this is done are: (1) irradiation, (2) feeding the cow irradiated yeast, and (3) the addition to the milk of a vitamin D concentrate, such as the unsaponifiable fraction of cod liver oil or irradiated ergosterol. All these methods have now been in more or less common use for two or three years. There is real concern in the minds of many health officers, physicians, and parents as to whether it is safe to rely on these vitaminized milks to supply the vitamin D needs of children. Many recent clinical data have demonstrated that all the forms of vitamin D milk will effectively prevent rickets in normal infants, and in most cases will cure the disease as well. While nearly all health agencies are concerned over the reliability of these vitamin D milks, few do anything about it.

In Massachusetts, we have examined a large number of samples of vitamin D milks over a period of 2 years,³ approximately 60 per cent of which were

furnished by health officers (see Table I). The data are largely self-explanatory. Normal milk contains a small but relatively constant amount of vitamin D. Pasteurization, homogenization and canning do not significantly lower the vitamin D potency. While the number of samples is small, there is seen to be a slight increase in the vitamin D potency in the summer months. Two different lots of canned irradiated evaporated milk showed about double the potency of freshly irradiated milk; *i.e.*, when such milk is reconstituted, the vitamin D potency is equal to freshly irradiated whole milk. Only 2 per cent of the 245 commercially irradiated samples were seriously below the guaranteed potency of 135 U.S.P. units (50 Steenbock units) per quart. This indicates that production methods of this form of vitamin D milk are carefully controlled so as to insure a stable and constant vitamin content. While fewer samples of yeast and vitamin D milks were examined, 7 of the 8 samples tested contained at least 400 U.S.P. units per quart. One sample contained vitamin D but in lesser amount than 400 units. Of the 4 Vitex milks assayed, only 1 was seriously below the 400 unit level.

TABLE I
VITAMIN D IN MILK

Kind of Milk	No. of Samples	Vitamin D Average	No. of Samples Below Guarantee	No. of Samples	Vitamin C. Calculated Protective Level
		U.S.P. Units			c.c.
Raw milk, May-June	4	27+	..	3	48
Raw milk, Oct.-Nov.	3	20	..	0	..
Pasteurized milk, autumn	4	20	..	2	62
Homogenized milk, pasteurized, autumn	2	20	..	1	75
Canned evaporated milk	2	27+	..	3	60
Canned evaporated irradiated milk	2	270+	0	0	..
Pasteurized irradiated milk	245	135+	5	3	71
Pasteurized fortified milk (Vitex)	4	400+	1	1	68
Certified metabolized (yeast) milk	3	400+	0	1	42
Pasteurized metabolized (yeast) milk	5	400+	1	1	83

These results indicate that constant care is required to maintain the guaranteed potencies of vitamin D milk. State department of health laboratories or other official agencies should include the routine examination of these milks with their other activities.

OTHER VITAMINS IN MILK

There is so little vitamin C in milk that until the recent introduction of the titration method for determination of ascorbic acid, it has not been possible to judge accurately the effect of pasteurization, homogenization, irradiation, etc., on the vitamin C content. In a few studies we have found that normal raw fresh milk is a very poor source of vitamin C. The calculated protective daily dose for a guinea pig is approximately 50 c.c. for summer milk. We have made no determinations on winter milk, but Hart, Steenbock, and Ellis⁴ found the protective dose was 75 c.c.

Pasteurization by the holding process destroys from 20 to 60 per cent of vitamin C. The single test made on milk homogenized at 1,200 lb. pressure showed practically no loss. King and Waugh⁵ have shown that pasteurization by the Electropure or Stamvik processes causes no appreciable destruction of vitamin C. Hess⁶ found a pint of fresh milk effectively prevented infantile scurvy. Probably a quart of pasteurized milk would be required. Lavaille,⁷ in France, found no appreciable loss of vitamin C in canned evaporated milk. Our own results indicate that canned evaporated milk has a calculated protective level of from 35 to 80 c.c., or roughly the same as fresh milk.

There is no evidence that vitamin A is injured by the usual manufacturing processes. Vitamins B and G, according to Dutcher, Guerrant, and McKelvey⁸ are injured somewhat by heat, but are remarkably constant in milk

throughout the year. Pasteurization destroyed a maximum of 38 per cent of the vitamin B in milk. Krauss, Erb, and Washburn⁹ found the loss of vitamin B due to pasteurization was about 25 per cent. While it is comforting to know that vitamins C, B, and G are present in milk, we do not ordinarily urge the use of milk because of their presence. Vitamins A and D are much more important in this food.

VITAMIN C IN FRUITS AND FRUIT PRODUCTS

Fruits are usually given to infants and children because of their antiscorbutic activity and laxative action; hence we are concerned mainly with the vitamin C content. We have made many vitamin C assays using the standard Sherman guinea pig technic. During the present summer we have compared the new titration method for ascorbic acid^{1,2} with the biological assay and have found very good agreement in the case of most fruits and vegetables. We have used pure ascorbic acid as a standard and have verified previously reported findings that 0.5 mg. of ascorbic acid is equivalent to 1.1 c.c. of fresh lemon juice. This amount is fully protective against scurvy for a young guinea pig. Calculation of protective doses is therefore relatively simple if we know the ascorbic acid content of a food.

The data are presented in Table II. The high antiscorbutic potency of citrus fruits, tomatoes, strawberries, rhubarb, and certain apple varieties such as Baldwin, Northern Spy, Ben Davis, and Winesap, are fully demonstrated. The canned citrus¹⁰ and tomato products retain their vitamin C remarkably well and may be used in place of the fresh fruit. The juices are almost as rich in vitamin C as the fruits. Home canned tomatoes are the equal of those commercially canned.¹¹ Fresh apple cider is a good antiscorbutic, but

TABLE II

VITAMIN C IN FRUITS AND FRUIT JUICES

	No. of Samples	Protective Level for Guinea Pigs
Fresh orange juice	4	1.2
Frozen orange juice *	2	1.4
Reconstituted orange juice		
from concentrate	1	1.8
Canned orange slices	2	1.3
Canned orange juice	2	1.1
Fresh grapefruit juice	2	1.3
Canned grapefruit slices	2	1.5
Canned grapefruit juice	4	1.5
Fresh pineapple *	1	8.5
Canned pineapple *	2	9.2
Canned pineapple juice *	1	8.0
Fresh apples (21 varieties)	34	3.5-25
Fresh sweet cider (Baldwin)	4	5-7
Pasteurized or benzoated sweet cider	4	20+
Baked apples (Baldwin)	2	4.0
Home prepared apple sauce (Baldwin)	4	30
Commercially canned apple sauce	2	36
Fresh or frozen strawberries	3	2.5
Fresh blueberries	18	5.5
Frozen blueberries	9	6.0
Canned blueberries	6	10
Fresh cherries, Montmorency *	1	16
Fresh or canned Royal Anne cherries *	2	24
Fresh Bartlett pears *	1	14
Fresh tomatoes	1	2-3
Home canned tomatoes	3	2-4
Commercially canned tomatoes	2	2.5-5
Home prepared tomato juice	6	3-4
Commercially canned tomato juice	13	2-7
Home prepared tomato purée (concentrated to ½ volume)	2	3
Canned puréed tomato *	2	3.5
Commercially canned tomato soup	1	5.6
Cranberries	6	3-4
Whole cranberry sauce	4	10-14
Canned, strained cranberry sauce	10	30+
Fresh Worden grapes *	1	16+
Commercially bottled grape juice *	1	20+
Dried prunes *	1	50+
Canned prune juice *	1	50+
Fresh Elberta peaches *	1	11
Commercially canned peaches *	2	12
Fresh rhubarb	5	2-4
Cooked rhubarb sauce	5	10

* Determined by titration method, using pure ascorbic acid as standard

preserved or bottled cider is poor. Baked apples retain their vitamin C content while apple sauce, either home prepared or the commercially canned product, has very little. Prunes and grapes show practically no vitamin C.

In summarizing these data it appears that the present custom of using citrus or tomato antiscorbutics is well founded and reliable. Our results show that other available fresh, frozen, and canned fruits or vegetables which are satisfactory secondary sources of vitamin C are blueberries,¹² strawberries,¹³ asparagus,¹⁴ apples,¹⁵ and cranberries.¹⁶

VITAMIN C STUDIES ON VEGETABLES

The use of fresh cooked, canned, and sieved (puréed) vegetables for infants and young children has been increasing. Besides the mineral and bulk values of these vegetables, the vitamins are of primary importance. Our work has been largely with vitamin C, although vitamin A has also been determined for a few vegetables. Both the Sherman guinea pig technic and the Bessey and King² direct titration of ascorbic were used. For most vegetables the latter method gives results entirely in accord with the animal bio-assay.

We have compiled data on fresh cooked, frozen cooked, canned, and canned sieved vegetables in Table III. In general our results are in agreement with those of Hoff¹⁷ who showed that cooking and canning are very destructive to the vitamin C of vegetables. Peas, asparagus, lima beans, and spinach are excellent sources of vitamin C in the raw state but lose a large percentage of the vitamin during processing. Freezing is much less injurious to the vitamin C than canning, although vegetables are pre-cooked (blanched) to inactivate enzymes previous to freezing. Little additional loss of vitamin C occurs during the time the vegetable is held in freezing storage,

but slight additional losses occur when the frozen products are cooked. In peas, spinach, and lima beans, the loss due to freezing is 40-65 per cent after cooking, while those incurred in canning are 75 to 90 per cent. This does not mean that cooked or canned vegetables are not suitable sources of vitamin C, since in spite of the large losses incurred during the heat treatments a considerable amount of vitamin C remains. Nearly all the vegetables examined would be classed as fair to good antiscorbutics, even after heat treatment.

Sieved vegetables for baby foods have been prominently advertised and sold during the past few years. Data obtained on several brands of these products show that they are quite similar, though usually poorer in vitamin C than the plain canned vegetables. The claims on the labels were usually

limited to a statement that the product contained the vitamin. So long as mothers do not rely on these products as potent antiscorbutics, there seems to be no cause for complaint from a public health viewpoint.

OTHER VITAMINS IN VEGETABLES

Hanning^{18, 19} found canned, strained vegetables to be good sources of vitamins A, B, and G. Apparently the heat treatments in cooking and canning are not greatly injurious to these vitamins. We found vitamin A of asparagus and spinach was uninjured by either cooking or canning. Hence, aside from a partial destruction of the vitamin C, cooked and canned vegetables retain, for the most part, the other vitamins.

SUMMARY

1. Fresh, pasteurized, and canned evaporated milks contain from 20 to more than 27 U.S.P. units of vitamin D per quart. Pasteurization and homogenization have no effect on the vitamin D potency of milk.

2. Of the 245 samples of irradiated milk assayed, only 5 were seriously below the 135 unit level.

3. One of the 8 samples of metabolized (yeast) milk and 1 of the 4 samples of fortified (Vitex) milk contained less than 400 U.S.P. units of vitamin D per quart.

4. Canned evaporated irradiated milk contained at least 270 units per quart.

5. Forty-three samples of fresh or manufactured fruit products, as well as the acid vegetables tomatoes and rhubarb, were examined for vitamin C content. In general, fresh and canned citrus fruits, tomatoes, and certain apple varieties (Baldwin, Northern Spy, Ben Davis and Winesap), as well as their juices, are excellent antiscorbutics.

6. Grapes, grape juice, peaches, cherries, prunes, pears, and certain varieties of apples (Tolman, McIntosh, Delicious and Jonathan), are poor sources of vitamin C. Fresh and canned pineapple as well as pineapple juice are of moderate value as antiscorbutics.

7. While raw, non-acid vegetables are usually good antiscorbutics, cooking and canning are very destructive to vitamin C. During a short cooking period, peas, asparagus, lima beans, and spinach lose 40 to 80 per cent of their vitamin C. The loss

TABLE III.

VITAMIN C IN VEGETABLES AND CANNED SIEVED VEGETABLES

	No. of Samples	Protective Level Grams
Fresh peas, cooked	32	3.6
Frozen peas, cooked	40	4.6
Canned peas	13	8.8
Canned sieved peas *	4	14.6
Fresh green asparagus, cooked	9	8.0
Frozen green asparagus, cooked	9	8.0
Canned green asparagus	3	10.0
Canned sieved asparagus *	2	18.0
Fresh spinach, cooked	3	8.0
Frozen spinach, cooked	3	6.5
Canned spinach	5	7.5
Canned sieved spinach *	4	5.5
Snap beans, cooked *	1	11.0
Canned snap beans *	2	13.0
Canned sieved snap beans *	2	15.0
Fresh lima beans, cooked	5	3.3
Frozen lima beans, cooked	7	3.5
Canned lima beans	7	8.5
Fresh carrots, cooked *	2	12.0
Canned sieved carrots *	2	20.0
Fresh beets, cooked	2	10.0
Canned sieved beets	2	13.0

* Determined by titration method, using pure ascorbic acid as standard

in canning may vary from 60 to 90 per cent.

8. Cooked, frozen vegetables are slightly lower in vitamin C than fresh cooked, but are considerably higher than the canned vegetable which has been heated for the table.

9. Canned, sieved (puréed) vegetable baby foods have the same or lower vitamin C values than the unstrained canned vegetable. In spite of the destructive action of heat on vitamin C in vegetables, sufficient amounts are retained to be of distinct antiscorbutic value.

CONCLUSION

This study furnishes experimental proof that the modern choice of foods for infants and young children, from a vitamin viewpoint, is well founded.

REFERENCES

1. Tillmans, J., Hirsch, P., and Hirsch, W. The Reduction Capacity of Plant Foodstuffs and Its Relation to Vitamin C. *Ztschr. f. Untersuch. Lebensmittel.*, 63:1-30, 1932.
2. Bessey, O. A., and King, C. G. The Distribution of Vitamin C in Plant and Animal Tissues and Its Determination. *J. Biol. Chem.*, 103:687-698, 1933.
3. Fellers, C. R. Bioassay of Vitamin D Milk. *Massachusetts Milk Insp. Assn. First Annual Yearbook*, 1935, pp. 12-13 and 35.
4. Hart, E. B., Steenbock, H., and Smith, D. W. Studies of Experimental Scurvy. *J. Biol. Chem.*, 38:305-324, 1919.
5. King, C. G., and Waugh, W. A. Effect of Pasteurization on the Vitamin C Content of Milk. *J. Dairy Sci.*, 17:489-496, 1934.
6. Hess, A. F. Scurvy in the World War. *Internat. J. Pub. Health*, 1:302-307, 1920.
7. Lavaille, P. Vitamin C in Cow's Milk. *Bull. soc. chim. biol.*, 9:208-221, 1927.
8. Dutcher, R. A., Guarrant, N. B., and McKelvey, J. G. Vitamin Studies XX. Effect of Various Methods of Pasteurization on Vitamin B and G. Content in Cow's Milk. *J. Dairy Sci.*, 17:455-466, 1934.
9. Krauss, W. E., Erb, J. H., and Washburn, R. G. The Effect of Pasteurization on Some of the Nutritive Properties of Milk. *Ohio Agri. Exper. Sta. Bull.*, 1933, p. 518.
10. Fellers, C. R., and Isham, P. D. Vitamin C in Canned Citrus Products. *J. Home Econ.*, 24:827-832, 1932.
11. Fellers, C. R., Clague, J. A., and Isham, P. D. Value of Commercially Canned and Laboratory Prepared Tomato Juices as Antiscorbutics. *J. Home Econ.*, 27:447-451, 1935.
12. Fellers, C. R., and Isham, P. D. Vitamins C and A in Blueberries. *J. Agri. Res.*, 47:163-165, 1933.
13. Fellers, C. R., and Mack, M. J. Vitamin C Content of Strawberries and Strawberry Ice Cream. *Indust. Eng. Chem.*, 25:1051-1052, 1933.
14. Fellers, C. R., Young, R. E., Isham, P. D., and Clague, J. A. Effect of Fertilization, Freezing, Cooking and Canning on the Vitamin C and A Content of Asparagus. *Proc. Am. Soc. Hort. Sci.*, 31:145-151, 1934.
15. Smith, G. G., and Fellers, C. R. Vitamin C Content of 21 Varieties of Massachusetts-grown Apples. *Proc. Am. Soc. Hort. Sci.*, 31:89-95, 1934.
16. Isham, P. D., and Fellers, C. R. Effect of Manufacturing and Preserving Processes on the Vitamins of Cranberries. *Massachusetts Agri. Exper. Sta. Bull.*, 296:2-19, 1933.
17. Hoff, J. J. Effect of Household Cooking and Canning on the Vitamin Content of Vegetables. *Ztschr. Ernährung*, 3:355-359, 1933.
18. Hanning, F. A Comparison of Vitamins B and G in Canned Strained Foods. *J. Nutrition*, 8:449-456, 1934.
19. Hanning, F. Canned Strained Vegetables as Sources of Vitamin A. *J. Am. Dietetic Assn.*, 9:295-305, 1933.

THE aim of education is the getting to know on all matters which concern us the best which has been thought and said in the world; and

through this knowledge turning a stream of fresh and free thought upon our stock notions and habits.—*Matthew Arnold.*

Some New Emphases in Public Health Nursing^{*}

ALMA C. HAUPT, R.N., F.A.P.H.A.

*Acting General Director, National Organization for Public Health Nursing,
New York, N. Y.*

TO appreciate what may be new in public health nursing, let us look back to the good old days of 1930 and through the ensuing years to the present. Our mirrors for reflecting the pictures of these years are various studies and reports of governmental health and welfare agencies and private national organizations concerned with health and with public health nursing.

Before we look at the picture, however, it may be well to consider what public health nursing had to offer as safeguards against the onslaughts of the depression. There were 20,000 public health nurses in 1931 as compared with at least 60,000 needed then and now. Of these, 52 per cent were employed by official agencies and 48 per cent by private organizations. We had also the following printed statements of standards in the public health nursing field, *Objectives in Public Health Nursing*, manuals of procedure for both nurses and board members, *Minimum Qualifications for Those Appointed to Positions in Public Health Nursing*, *Outline for Appraisal of Public Health Nursing*, a detailed report on the method of computing the cost of a visit, suggested records and report forms. During the very heat of the

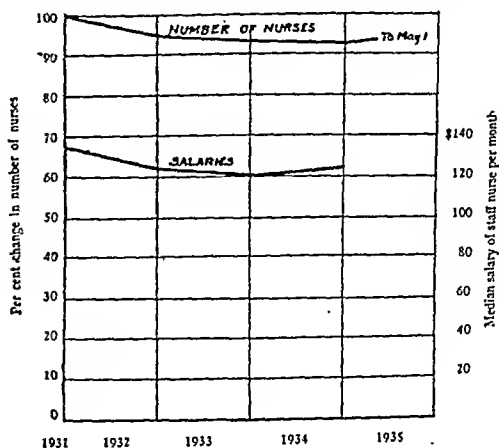
fray in 1934, the *Survey of Public Health Nursing*¹ was published to show us how far we had put our standards into practice and how far we still had to go.

What, then, has happened to public health nursing? We have comparative figures on changes in personnel, salaries, the income and expenditures of private agencies, visits by public health nurses and visits by patients to clinics.

Figure I shows the changes in number of public health nurses employed and changes in salary. This is based on a comparison between the count of 15,915 public health nurses, exclusive of industry, as given in the National Organization for Public Health Nursing

FIGURE I

CHANGES IN NUMBER OF PUBLIC HEALTH NURSES AND IN SALARIES SINCE 1931



^{*} Read before the Public Health Nursing Section of the American Public Health Association, at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

Census of 1931,² the yearly review studies of the N.O.P.H.N.³ made in 1933, 1934, and 1935, and the annual salary studies of the N.O.P.H.N.⁴ In general, since 1931, there has been a loss of 5.4 per cent in total number of nurses employed which in actual numbers is 853.

Another glimpse of this same question of personnel is given in a comparison of the percentage of agencies reporting changes in size of staff. From 1932 on, more agencies reported decreases than increases until 1935 when for the period up to May 1 the percentage of reporting increases exceeds those reporting decreases.

Data on salaries paid to public health nurses are available for each year from 1932 through 1935⁴ as shown in Figure I. The median salary is recorded, meaning that the number of nurses receiving less than that salary is the same as the number receiving more. For Health Departments and Public Health Nursing Associations (the private agencies) the median in 1932 was \$135 a month. This dropped gradually to \$120 a month in 1934 and

in 1935 has been raised to \$125. The median salaries of school nurses employed by boards of education and health departments ranged from \$1,760 a year in 1932 to \$1,400 in 1934 with an increase to \$1,500 in 1935. We may therefore conclude that salaries reached their low level in 1934 and are on the upgrade but still 8 per cent below the 1932 level.

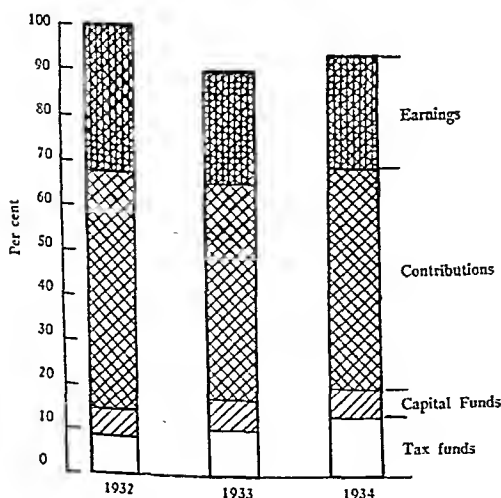
The total income and expenditure of agencies is an important index of the effects of the depression. Dr. Joseph W. Mountin shows the following picture of the average per capita expenditure by health departments⁵ on basis of figures reported in the Inter-Chamber Health Conservation Contests: 1931—appropriations maintained, 1932—some reduction, 1933—drastic cuts with budgets approaching those reported for 1923.

Another study⁶ indicates that the average per capita expenditure for public health in 1929 was \$1.00 per capita per year, that it sank in 1934 to \$.70. Contrast this with the \$2.00 per capita expenditure generally recognized as a minimum for adequate health protection and with the fact that up to one-half of this amount is needed for public health nursing!

Unfortunately, as Dr. W. Frank Walker has pointed out in his article, *Analysis of Public Health Expenditures by Geographic Subdivisions*,⁷ "it was not possible to isolate in health department budgets the cost of public health nursing." However, the N.O.P.H.N. has some valuable figures³ regarding income and expenditures of a representative group of private agencies for the years 1932, 1933, and 1934. Income changes are shown in Figure II. In 1933 there was a decrease in income of 10 per cent from that in 1932. In 1934 there was an increase over the previous year of 2.6 per cent. Analyzing this income for per cent derived from various sources

FIGURE II

PER CENT CHANGE IN TOTAL INCOME AND IN AMOUNTS RECEIVED FROM VARIOUS SOURCES OF INCOME BY PRIVATE PUBLIC HEALTH NURSING AGENCIES—1932-1934



in 1932 and in 1934, we find that the per cent from tax funds increased from 9 to 11 per cent, capital funds from 6 to 8 per cent, and contributions from 53 to 55 per cent. Earnings from patients' fees and contracts for service were the only source that declined and this went down from 31 per cent in 1932 to 26 per cent in 1934. The percentage of the earned income paid by insurance companies in 1932 was 83 and in 1934, 77. From recent figures of the Metropolitan Life Insurance Company we learn that the expense for its nursing service to policy holders has taken an upward turn, increasing from 1934 to the first 8 months in 1935 by 10 per cent. It is interesting and significant to know that the percentage of private agencies receiving some tax support has steadily increased from 60 in 1932 to 69 in 1934.

If the private agencies on the whole suffered a 10 per cent decrease in income in 1933, made up only by a 2.6 per cent increase in 1934, let us see how they "took it." The total decrease in expenditures in 1933 was 11 per cent and the increase in 1934 only 1 per cent. This would seem to indicate a conscientious program of budget balancing on the part of the private agencies. Salaries were 83 per cent of the total in 1932 and 82 per cent in 1934. Can we not say then that it was the nurses themselves who took the brunt of adjustment. Their salaries were the biggest budget items and the most vulnerable points of attack.

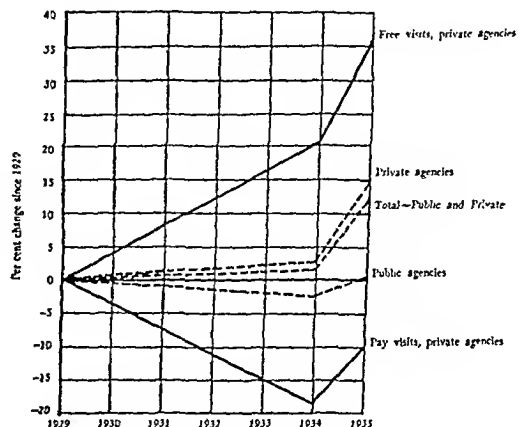
Briefly, we have the picture of 853 less nurses now than in 1931, a slight beginning at replacing that reduction; there was a considerable drop in amounts paid for salaries, with 1935 bringing a slight increase. Incomes in a group of private agencies fell 10 per cent in 1933 and were restored 2.6 per cent in 1934. The most important increase in budgets of the private agencies has come from additional tax

support; the largest decrease has been in earned income from patients and from insurance contracts. In adjusting to these changes, the private agencies tried to balance their budgets chiefly by reducing staff, reducing salaries, and making all possible economies.

At the same time that all this has been happening, the economic situation among American families has brought increased need and demand for public health nursing service. Space does not permit a review of studies made of health and the depression. Suffice it to mention the reports of the U. S. Public Health Service and the Milbank Memorial Fund showing that there is 50 per cent more illness among the "poor" than among those in "comfortable" circumstances.⁸ The Children's Bureau⁹ reports the total relief expenditures from public and private funds in 120 urban areas to have risen from January, 1929, to July, 1935, from 4 to well over 60 million dollars. The trend as indicated by Children's Bureau charts is still upward.

FIGURE III

PER CENT CHANGE IN NUMBER OF VISITS BY PUBLIC HEALTH NURSES IN 13 PUBLIC AND 24 PRIVATE AGENCIES, JAN.-JUNE, 1929 TO JAN.-JUNE, 1935, AS REPORTED TO CHILDREN'S BUREAU, U. S. DEPARTMENT OF LABOR



We are indebted to the Children's Bureau for the best figures available as to the effects of the depression on the number of visits made by public health nurses.¹⁰ Figure III shows the tremendous increase in number of home visits made by public health nurses. It is worthy of note that pay service has decreased and free service has greatly increased. An even more appalling increase is indicated in the number of visits by patients to clinics and health conferences where public health nursing service is involved. Changes in visits and cases are reported by the Metropolitan Life Insurance Company as follows:

VISITS AND CASES REPORTED BY VISITING NURSE ASSOCIATIONS TO THE METROPOLITAN DURING THE FIRST 8 MONTHS OF 1935, AND THE CORRESPONDING PERIOD OF 1934

	1934 Associations	1935 Associations	Per Cent Change
Cases (Incl. Mat. & H.S.)	253,519	274,997	+8%
Total Visits	1,442,952½	1,490,945½	+3%

The Metropolitan Life Insurance Company further emphasizes the situation which is making new demands on public health nursing. In its May 1934 *Bulletin*¹¹ the age distribution of the population was given as follows:

1,850 under 20 years	52.5%
over 65 years	2.6%
1,930 under 20 years	38.8%
over 65 years	5.4%

The June 1935 *Bulletin*¹² states that for the first time in 10 years the birth rate increased; in the previous 10 years this rate had dropped approximately 26 per cent, or an average of 2.6 per cent per year. Between 1933 and 1934 it rose 3 per cent, which may be just a temporary rise. Thus a changing age population and an increased birth rate raises for public health nursing agencies the problem of more nursing care for the aged and a greater volume of maternity and child welfare work.

These varying conditions make de-

mands on all forms of health activities and all types of public health organizations. Public health nursing is but a part of the whole machinery. As such it has made many adjustments in actual content and program which are not so easily recorded as the statistical data given above. However, the Adjustments Committee of the N.O.P.H.N. through a series of questionnaires has tried to keep its "finger on the pulse" of program changes. It is not too much to say that public health nursing agencies have attempted to preserve a service of high standard and to adjust to the most economic and effective administration. According to our reports, there has been little change in nursing under boards of education. Under health departments and in the private agencies, public health nurses have given more time to clinics and more to bedside care with corresponding reduction in time spent in purely "educational" activities. However, this new distribution of activities has led to a deepening appreciation of the idea that every contact the nurse has with the family, whether in the clinic, school or home, should be educational and productive. There seems to be a better appreciation today that the nurse teaches best by "doing." Also the increase of clinic contact has two positive advantages: (1) The family takes the initiative in seeking clinic service. Presumably the family wants the service enough to come and get it. Too often in the past, families have relied on nurses to bring the service to their very doors. (2) The clinic contact from the public health nursing standpoint also saves the nurse's travel time and hence expense. Certainly home visits are and always will be necessary, but clinics and conferences in nurses' offices can be made increasingly educational and valuable.

Another change has been less routinized service in terms of spacing

of visits and a greater attempt to understand the individual needs of each family. We have learned much (and still have much to learn) from the mental hygiene field about human relations and family problems. The very problems themselves have made us turn to coworkers in related fields for help. Public health nurses have seen more mental distress; increased want; more nutritional disturbances; greater need for bedside care in the homes, especially for mothers; communicable disease cases, and the aged sick.

Inevitably, public health nurses with depleted ranks and more demand for service have looked for help. That help has been chiefly the families themselves. The nurses have had a new impetus to teach members of the families to live hygienically, to use preventive measures for the control of communicable diseases, and to care for each other when sick. Thus a great coöperative enterprise has been going on between public health nurses and the families they serve.

Three major lessons we have learned from our struggles during the depression are pointed out in *The Survey of Public Health Nursing*¹:

First, to be better teachers of public health, nurses need better preparation in schools of nursing, in postgraduate courses, and through expert nursing supervision and teaching in the agencies employing them.

Second, our organization picture is confused and chaotic in many cities because too many agencies employ public health nurses. Our survey suggests that large cities experiment with but two agencies; one the health department whose nurses help in the control of communicable diseases, and the health education of all age groups; the other a private agency offering bedside nursing as a part of a family health service. One agency may be sufficient in small communities and rural areas.

Third, we increasingly need the help of laymen for interpretation and support of public health nursing service, whether that service be given by the public or the private agency.

Such is a sketchy picture of public health nursing since 1930. But this is not complete without turning on it the spotlight of the federal agencies that add new color. In 1933, the Federal Emergency Relief Administration through Rules and Regulations No. 7¹³ made it permissible for public relief agencies to provide bedside nursing to families on relief. Such nursing could be paid for by public relief funds and bought from whatever local agency offered the service. Thus nursing care in illness was formally recognized as a necessity along with food, clothing, shelter, and medical service. Also private agencies could be used. This may be one reason why the tax support of private agencies has increased. The N.O.P.H.N. was consulted by the F.E.R.A. in planning this program and was called into vigorous action by many states and communities in putting it into effect. Provision was made in Rules and Regulations No. 7 for the setting up of state advisory committees of the professions involved. As the federal plan was permissive rather than mandatory, there is much variation state by state, but the principles involved have been effectively carried out in many communities, and from the standpoint of public health nursing seem sound.

Entirely separate from Rules and Regulations No. 7, and quite different in purpose, are the three federal plans for putting the unemployed back to work. The Civil Works Program was launched in the fall of 1933. This was applied to nurses as well as to other types of the unemployed. Projects were set up and it is estimated that out of a total of 8,000 unemployed nurses in the country, 6,000 nurses were put to work. Of these some two-thirds

went into public health nursing although many had had no previous special preparation for this work.

Immediately the three national nursing organizations (the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing) set up "safeguards" in which the F.E.R.A. cooperated. These were that

1. The qualifications of nurses be passed upon by a professional group of nurses.

2. Nurses be assigned where possible to existing agencies rather than setting up new agencies.

3. All nurses be under qualified nurse supervision.

4. Projects be selected in relation to community needs and the ability of the nurses to carry them out.

A dramatic picture could be drawn of overzealous ambitions, confusion, misunderstandings, etc. Suffice it to say, that on the whole much good has been accomplished. Tribute is due the advisory nurses of state health departments, the administrators, supervisors, field nurses, and board members of local agencies who plunged suddenly into the game of helping new and often raw recruits so effectively that harm was prevented, and much progress has been made.

C.W.A. and C.W.S. were shortly followed by nursing projects under state E.R.A.'s. I need only refer you to reports from 47 out of 48 states in *Public Health Nursing*¹⁴ for a graphic description of their struggles. And today these struggles are going on under the Works Progress Administration. Fortunately, the number of unemployed nurses is lessened; fortunately the nurses in projects proved themselves; and fortunately the "safeguards" are more respected today than ever before.

However, with the changing emphasis from direct relief by the federal gov-

ernment to state and local initiative and responsibility for all who are in distress, public health nursing groups and their lay friends, in states and localities, have a new opportunity to explain again the fundamental principles of public health nursing, and to make public health nursing fit into the work program. There are many hazards to standards at the present time and many "new alignments" to be faced.

Out of all of this emergency service comes the hope, even though long deferred, of the Social Security Program. We rejoiced when in 1934 the U. S. Public Health Service appointed Pearl McIver as Associate Public Health Nursing Analyst to assist state health departments in the development of state-wide public health nursing services. We look forward to the day when the Children's Bureau too will have a public health nursing consultant for its maternity, child health, and orthopedic programs.

One of the most gratifying signs of the times is that the U. S. Public Health Service, the Children's Bureau, and the Health Department of the District of Columbia all have cooperated in setting up new federal civil service classifications for public health nursing positions which will guarantee the best possible leadership and set a fine example for other groups to follow.

Things are stirring in public health nursing. We are facing "new alignments." Closer relationships are developing between public health nursing and the medical profession. We are seeing a new place for ourselves in relation to social workers. We appreciate that public health nursing is not an entity in itself but an integral part of the whole health machinery. We realize that today we are more dependent than ever on an interested, informed, and generous public.

Many a rural area is aware for the first time of its need for public health

nursing service. Many cities realize their insufficiency. Agencies want to give better service and nurses want to be better prepared. There is much that is new in public health nursing. The future of this service requires a fine balance between allegiance to accepted standards and "fundamental principles" and an experimental attitude to adapt them to the changing and new needs of our present and our future day. May we always be willing to experiment!

REFERENCES

1. *Survey of Public Health Nursing*. National Organization for Public Health Nursing. Commonwealth Fund, 1934.
2. *Census of Public Health Nursing*. National Organization for Public Health Nursing, 1931.
3. Tattershall, Louise M. Changes in the Public Health Nursing Field During 1932, *Pub. Health Nurs.*, 25:216, 1933; Dollars and Cents, *ibid.*, 25:421, 1933.
- Miller, Anna J. Yearly Review of Public Health Nursing, *ibid.*, 26:454, 1934; What Happened to Public Health Nursing in 1934, *ibid.*, 27:518, 1935.
4. Tattershall, Louise M. Salaries of Public Health Nurses. *Pub. Health Nurs.*, 24:253, 1932; Salaries of Public Health Nurses, *ibid.*, 25:289, 1933.
- Miller, Anna J. Salaries of Public Health Nurses in 1934. *Pub. Health Nurs.*, 26:258, 1934; 27:344, 1935.
5. Mountin, Joseph W. A Central Information Service on Current Practices of Health Departments. *A.J.P.H.*, 25:347, 1935.
6. Editorial: The Depression and Public Health Expenditures. *A.J.P.H.*, 24:755, 1934.
7. Walker, W. F. Analysis of Public Health Expenditures by Geographic Subdivisions. *A.J.P.H.*, 25:851, 1935.
8. Perrott, G. St. J., and Collins, Selwyn D. Sickness and the Depression. *Milbank Quart. Bull.*, VI:281, 1933.
9. *Changes During July, 1935, in Different Types of Public and Private Relief in Urban Areas*. U. S. Dept. of Labor, Children's Bureau, Sept. 10, 1935.
10. Per cent change in visits by public health nurses, as reported by 13 public agencies in 12 urban areas and 24 private agencies in 21 urban areas. Per cent change in the number of visits to clinics and health conferences as reported by 37 public agencies in 14 urban areas and 109 private agencies in 16 urban areas. Children's Bureau (unpublished).
11. National Contrasts in Age Distributions. *Stat. Bull.*, Metropolitan Life Insurance Company, Vol. 15, May, 1934.
12. Better Times and the Birth Rate. *Stat. Bull.*, Metropolitan Life Insurance Company, Vol. 16, June, 1935.
13. Governing Medical Care Provided in the Home to Recipients of Unemployment Relief. *Rules and Regulations* #7, F.E.R.A., Washington, D. C., Sept., 1933.
14. State E.R.A. Activities in Public Health Nursing. *Pub. Health Nurs.*, 27:95, 1935; *ibid.*, 27:209, 1935.

A Retrogressive Trend

SINCE the war, the annual matriculation at medical colleges has shown a progressive increase which threatens to undermine the important reforms accomplished by the Council on Medical Education of the A.M.A. From 18,200 in 1925, the number of medical students has grown to close to 23,000 in 1935. This figure is not far removed from the enormous enrollments of the early part of the century.

An increase on this scale, which is not justified by any public need, must inevitably entail an impairment of the

standards of medical education. Matriculates are chosen with less discrimination and the student body falls short of the scholastic and personal level achieved by more restricted admissions.

Fortunately, the number of schools has not kept pace with the growing matriculation and the colleges in existence are, on the whole, superior institutions; but their facilities are not equal to the sharp rise in enrollments.

—Editorial, *New York State J. Med.*, Oct. 1, 1935, p. 986.

Immunological Application of Placental Extracts*

ELLIOTT S. ROBINSON, M.D., F.A.P.H.A., AND CHARLES F. MCKHANN, M.D.

Director, Antitoxin and Vaccine Laboratory, Massachusetts Department of Public Health; and Assistant Professor of Pediatrics, Harvard Medical School, Boston, Mass.

MOST of our work with placental extract has been directed to the control of measles; so certain aspects of this disease should be discussed first in order to give an idea of the problems involved. The importance of measles is easily seen in the morbidity records of Massachusetts, for in 2 of the past 10 years there have been reported upward of 40,000 cases a year, and in none of the last 10 years has the number of cases fallen below 13,000. The actual number of cases of measles is undoubtedly larger than these figures indicate. It is true that the number of deaths from measles is by no means large, for the fatality rate has varied from 0.2 per 100 cases reported up to 1.2 per 100 cases reported, but there have been in Massachusetts about 1,500 deaths from this disease during the years 1925 to 1934.

The danger from measles lies in the complications, usually due to secondary infections, which may have a fatal outcome. Of these, by far the most important are bronchial pneumonia with its resultant empyema; and infections of the middle ear, either otitis or mastoiditis. Other dangerous but less

frequent complications are tuberculosis, enteritis, noma, and encephalitis.

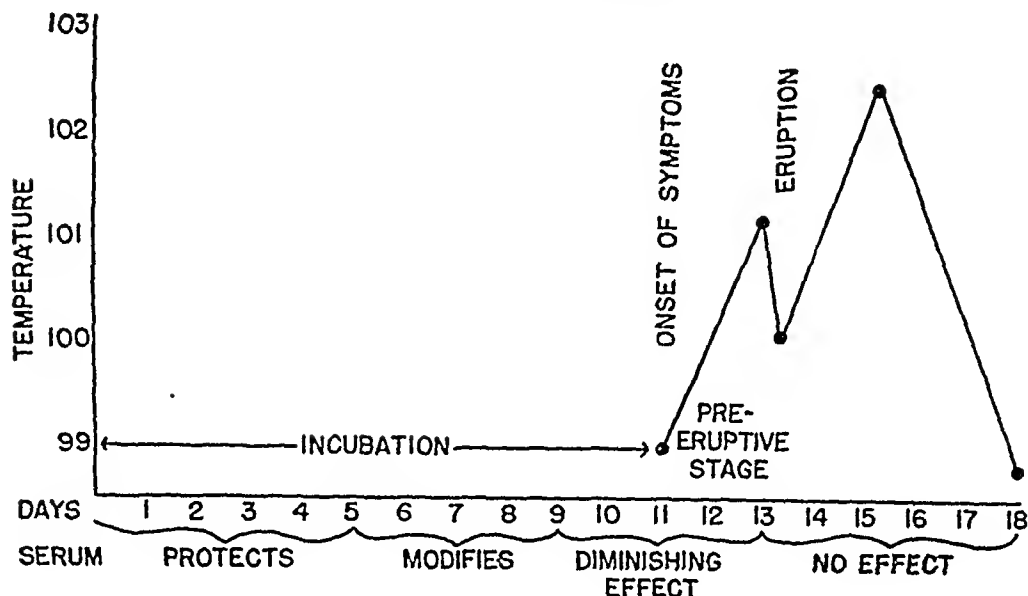
It has been known for some time that measles is most dangerous in children between the ages of 1 and 4 years, particularly if malnourishment, tuberculosis, or other acute or chronic illnesses are also present. Children of these ages should be protected against measles if it is at all possible. Protection is sometimes desirable even in those above the age of 4. Infants under the age of 5 months seldom contract measles unless perchance the mother has not had the disease.

The control of measles by the ordinary public health measures of isolation, placarding, and quarantine is ineffective. The need of a practical method of active immunization is obvious, but so far no generally applicable active immunization method has been suggested, and until such a method is available, there is need of using such methods of passive immunization which are suitable and available.

The methods of passive immunization that have been suggested are the injection of convalescent serum, the serum or whole blood of immune adults, and finally, the one in which we are most interested at the moment, placental extract. Of these, adult immune

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

FIGURE I

Usual Course of Measles

serum and adult immune whole blood are distinctly less to be favored than either convalescent serum or placental extract, largely because the potency of the adult serum or blood tends to vary widely and the doses required for effective passive immunization are large, usually 15 to 20 c.c. for serum, and 30 to 40 c.c. for whole blood. In contrast to this the dose of convalescent serum is usually about 4 to 6 c.c., and of placental extract about the same. The difficulty with convalescent serum is that the supply is limited, and as measles is a disease of childhood, the possible donors of convalescent serum are usually small, and only small amounts of blood may be safely taken from them.

Several factors influence the effective dosage in any of these products. First, there is the question of potency, and in this respect, convalescent serum and placental extract are usually preferable to either adult immune serum or adult whole blood. Perhaps next in importance is the time of ad-

ministration during the incubation period. Any of these products if given early in the incubation period will very often prevent measles, but they are less efficacious in this respect if given later in the incubation period. This difficulty can be offset to some extent by using larger doses of serum when administration is delayed. Another factor is the age and weight of the patient, for in general the older the child the larger it is, and the larger the child the larger the dose of serum necessary to give an adequate concentration of antibodies to afford reasonably efficient passive immunization. Possibly as important as any of these factors is the degree of exposure. This has been brought out definitely both in McKhann's previous work and also in the recent papers by Schick and Karelitz.¹ All of these authors agree that the exposure sustained in such institutions as hospitals or schools is less likely to cause infection than is that to another child in the same family at home. Schick and Karelitz have extended this

TABLE I

PATIENTS TREATED FOR PREVENTION OR MODIFICATION OF MEASLES WITH ADULT SERUM, CONVALESCENT SERUM, AND PLACENTAL EXTRACT

<i>Procedure</i>	<i>Number of Cases</i>	<i>Protected</i>		<i>Modified</i>		<i>Failed</i>	
Adult Serum	584	329	56.4%	139	23.8%	116	19.8%
Convalescent Serum	1,627	1,227	75.4%	273	16.8%	127	7.8%
Placental Extract	1,628	1,138	69.9%	417	25.6%	73	4.5%

Figures for adult serum and convalescent serum collected from the literature.

observation to show that the economic status of the home is also important, inasmuch as the exposure is more intimate and therefore more likely to give rise to an infection in the more crowded home.

By varying the factors of size of dose and time of administration, it is possible to prevent the disease entirely or to modify it. If the disease is prevented entirely, the immunity is purely passive and temporary, lasting from 3 to 6 weeks only. Such a method of administration is indicated for institutional outbreaks and for individual children temporarily exposed to the disease, who are debilitated, acutely or chronically ill, or tuberculous.

Of greater value from the standpoint of public health control of the disease is its modification by the use of serum. It is believed that an attack of modified measles will give an immunity which is usually permanent. The severity of the disease is reduced by modification to the point where it is no longer particularly serious. It is true that the incubation period may be somewhat prolonged, but this is generally not a matter of great moment. Complications and sequelae are few and usually trivial. Modification is indicated for exposed normal, healthy children. Figure I indicates the portions of the incubation period in which protection or modification of the disease may be expected to follow injection of serum or placental extract. Briefly, if serum is given in an adequate dose during the first 5 days of the incubation period,

one may expect that the child injected will not develop the disease. If, however, the administration of serum or of extract is delayed until the 5th to the 8th or 9th day, modification of the disease is more likely. If the serum or extract is given on the 9th day or later, it may have little or no effect. This carries us up through the pre-eruptive stage of measles. Serum or extract given as a therapeutic measure after the eruption appears has no pronounced effect.

Table I shows the effect of adult serum, of convalescent serum, and of placental extract when given for protection or modification. These figures include both hospital and home exposures. The important point of this table is that the adult serum failed either to protect or modify about 20 per cent of the cases, convalescent serum failed in about 8 per cent, and placental extract in about 4½ per cent.

Table II gives a more detailed picture of the effect of placental extract. In the first line across the table is seen the result of extract given during the first 4 days of exposure for the purpose of protecting the child entirely against the development of measles. Sixty-four per cent of the children were protected, and a further 31 per cent showed a definite modification of the disease. In only 5 per cent was there no protection and no modification. The administration of placental extract to produce modification of the disease is a somewhat more difficult problem inasmuch as it is quite possible to give too

TABLE II

PLACENTAL EXTRACT FOR PREVENTION OR MODIFICATION OF MEASLES
INTRAMUSCULAR INJECTION

<i>Intimate Exposure</i>	<i>Day of Exposure</i>		<i>Protected</i>	<i>Modified</i>	<i>Failed</i>	<i>Total</i>
Given to Protect	1- 4	{ No. 171	83	14	268	
		{ % 63.8	31.0	5.2		
Given to Modify	5-12	{ No. 264	283	42	589	
		{ % 44.8	48.1	7.1		
<i>All Exposures</i>	1-12	{ No. 1,138	417	73	1,628	
		{ % 69.9	25.6	4.5		

The figures for intimate exposure include children exposed at home to a brother or sister, or to a roommate in a boarding school, under which conditions 90 per cent of non-immune children may be expected to acquire the disease. In addition any child exposed at school who develops measles has been transferred to the intimate exposure group. This increases the entire number of failures in this group, but it seems to be fair in that it shows they actually were exposed to the disease.

much extract, or give it too early, and so get complete protection, as well as to give an insufficient amount or give it too late, and so fail to get any modification at all. In the present group of 589 children only 48.1 per cent showed a definite modification of the disease, but a further 45 per cent were completely protected. In 7 per cent there was no protection or modification. It should be remembered that the foregoing figures refer to children who were intimately exposed to the disease. If we include all children who received extract, 1,628, the proportion protected entirely is 70 per cent, a further 25 per cent showed modification of the disease, and 4.5 per cent showed neither protection nor modification. These figures are included here chiefly to show that the percentage of failures is less when all types of exposures are included.

The administration of placental extract intramuscularly is followed in

some instances by local and general reactions. Table III shows that somewhat more than 60 per cent of the children have no reactions of either type following the administration of extract; slightly less than one-third have a local reaction; about one-eighth have a febrile reaction of some sort or other; while only about 4 per cent suffer a local reaction great enough to be classified as moderately severe; and in only 2.5 per cent does the temperature go above 101°. Since some children had both types of reaction it seems safe to say that in only about 5 per cent was there a reaction that by any classification could be considered a moderately severe one.

The practice in certain parts of the world of feeding children dried placenta as a remedy for various ailments suggested the use of our placental extract by mouth. We have records of 109 children (Table IV) intimately exposed to measles to whom

TABLE III

REACTIONS

	<i>Total</i>	<i>No Reaction</i>	<i>Local</i>		<i>Febrile</i>	
			<i>Total</i>	<i>Moderately Severe</i>	<i>Total</i>	<i>T = 101° +</i>
No.	1,533	961	485	65	189	39
Per Cent		62.7	31.6	4.2	12.3	2.5

TABLE IV

PLACENTAL EXTRACT
ORAL ADMINISTRATION*Prevention or Modification of Measles
Susceptible Patients, Intimately
Exposed*

	<i>Total Prevented Modified Failed</i>			
Given to Prevent	33	14	8	11
Given to Modify	76	16	40	20
<hr/>				
	109			

placental extract was so administered. Of these, 33 were given the extract to prevent the disease, and in 14 this was accomplished. In 8 others, modification resulted, but in 11 no benefit was obtained. In a group of 76, to whom the extract had been given with the idea of modifying the disease, it was entirely prevented in 16, modified in 40, and failed either to modify or protect in 20. As might be expected, the results of oral administration were not so good as intramuscular injection, but, on the other hand, the figures indicate that a certain amount of measles antibody will pass from the gastrointestinal tract and bring about a definite passive immunity in some individuals.

Another evidence of the absorption of antibody from placental extract given by mouth is that 23 patients with a positive Dick test have been rendered Dick negative by placental extract so given. The duration of the negative stage has been variable but was as long as 18 days in 13 individuals. The importance of this procedure in the prevention of scarlet fever remains to be determined.

In addition to the evidence of antibodies shown by human experiments, there is also evidence from animal experiments that the extract contained diphtheria antitoxin, and an antibody against poliomyelitis. There is no need of discussing these antibodies here.

The method of preparing placental extract has not been sufficiently standardized to lead one to believe that the

most satisfactory method has been found. Various fractions have been made separating the placental extract into various globulins; but it does not appear as yet that these various fractions differ materially so far as their content of measles antibody is concerned. It has seemed that the nearer one stays to a whole extract, the more efficacious a given dose of the material will be for measles prophylaxis. On the other hand, the whole extracts are extremely difficult to filter. It is obviously desirable—if not essential—that the final product shall be passed through a Berkefeld filter to insure its sterility, and this process must be carried out even at the risk of losing a certain amount of antibody. It is much better to use a dose of 5 or 6 c.c. of material that has been filtered than to attempt to give unfiltered material in a dose of 2 or 3 c.c.

The only direct method of determining the potency of placental extract is to use each lot experimentally for its ability to prevent measles. Such indirect methods as the determination of diphtheria antitoxin content of the original material and of the fractions made are not satisfactory. The source of error here is that the diphtheria antitoxin is apparently segregated almost entirely in the pseudoglobulin fraction, but measles antibody is more generally distributed among all the globulins. There was an indication in the earlier part of the study that the nitrogen content of the extract was about as satisfactory as any other method. The figures for this have not been compiled on the later cases but it is known that the extracts with a higher nitrogen content are more effective than those that are too low. It is evident that a final satisfactory method of making the extract and of determining the proper dosages depends upon the solution of this fundamental problem of potency testing.

CONCLUSIONS

1. The use of placental extract in the prevention and modification of measles offers at the moment the best hope of giving us some control of this disease.

2. Placental extract appears to be more efficacious in these respects than convalescent serum; and convalescent

serum, in turn, is more efficacious than adult serum or whole blood.

NOTE: This study was supported in part by a grant from the Commonwealth Fund of New York.

REFERENCE

1. Karelitz, Samuel, and Schick, Bela. Epidemiologic Factors in Measles Prophylaxis. *J.A.M.A.*, 104:991 (Mar.), 1935.

Humanizing Knowledge

AT present so-called "serious" books, even when they pretend to be of a popular nature, are rarely written exclusively for the general reader. Scholars and men of science almost always write more or less unconsciously for one another. This is a natural outcome of their training. They must prove their preparation to deal with the subject in hand. They cannot forget their fellow workers in the field, and properly wish to enjoy the reputation of scientists and scholars and not that of mere popularizers. They are so accustomed to technical terms that they use them without

realizing how few of their readers can be expected to understand them. This is the result not of a love of pedantic display but an acceptance of the rules of the game as they have been taught it. . . . There is a heavy prejudice in learned circles against the popularizer. Those who are disinclined, or mayhap unable, to write plainly and pleasantly for the layman, are prone to denounce all attempts to popularize knowledge as vain or as mere expedients to keep the pot boiling.—James Harvey Robinson, *The Humanizing of Knowledge*, 1924.

Recent Experiences in Scarlet Fever Control*

JOHN P. KOEHLER, M.D., F.A.P.H.A.

Commissioner of Health, Milwaukee, Wis.

THIS paper is being presented not so much because the writer has any new scarlet fever control measures to offer, but rather for the purpose of reporting certain experiences following the extensive use of well known control measures during a scarlet fever epidemic in Milwaukee. Even most of the experiences recorded herein are not new, but very similar to those reported by others.

It is necessary for me to limit this report almost entirely to statistics, personal observations, and conclusions, without describing procedures in detail or presenting all reasons for conclusions.

The scarlet fever epidemic began in January, 1934; abated temporarily during the latter half of July; recrudesced rapidly in September; and reached its peak for the year in October with 1,041 new cases reported.

The 1935 peak was in January, when 1,407 new cases were reported, which number might have been exceeded in February if additional control measures had not been taken. During 1934 there were 5,964 cases of scarlet fever reported with 20 deaths. During the first 6 months of 1935 there were 4,541 cases and 24 deaths reported.

When it became apparent during the early months of 1934 that Milwaukee

was to be visited by one of its periodic scarlet fever epidemics, immediate and serious consideration was given to all the available scarlet fever control measures.

IMMUNIZATION

After a thorough discussion of immunization with various committees of the County Medical Society, the Health Department with the approval of the County Medical Society, decided to immunize children in highly infected schools.

Dick testing to discover the susceptibles was immediately started in 12 public and parochial schools with an enrollment of approximately 10,000. The positive reactors were started with the 5 doses of toxin recommended by the Dicks: 500, 2,000, 8,000, 25,000 and 80,000 skin test doses at weekly intervals. Immunization was also offered by many private physicians as well as by the various Health Department clinics. Dick tests only were given to children in 7 additional schools and all reactors were referred to the family physician or Health Department clinics. As the disease spread, immunization was started in 6 additional schools, with an enrollment of approximately 5,000.

The work was started in 12 schools in March, 1934. The 6 additional schools were Dick tested and immunized during May, 1934. In October, 1934, 3 additional schools with an en-

* Read before the Health Officers Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

rollment of 2,240 were immunized. Seventeen thousand, five hundred preliminary Dick tests were made in schools and Health Department clinics, of which approximately 66 per cent were positive and 34 per cent were negative. Approximately 6,000 out of 9,000 children who started immunization completed the 5 doses. Re-Dicks of approximately 5,700 children receiving 5 doses of Dick toxin, gave 93½ per cent negative and 6½ per cent positive reactions. A 6th injection was given to approximately 200 children who had shown a positive re-Dick.

Since immunization against scarlet fever on a large scale was a new procedure in Milwaukee, it was deemed advisable to take the following precautions:

1. Every child was given a medical inspection before it was given its first dose of scarlet fever toxin. Children with chorea, rheumatism, heart disease, asthma, eczema, and other allergic ailments, were not immunized.

2. Every child had its temperature taken before each dose of toxin in order to exclude those that might be ill. At first a temperature of 99.6° was the maximum permissible, but this temperature was so common among the children that the maximum was soon raised to 100° F.

3. Whenever possible, all immunization work in schools was done in the afternoon. Some children immunized during the forenoon vomited during the afternoon and upset the entire classroom.

4. When immunization treatments were given in the morning, the school nurse remained at the school during the afternoon.

5. A nurse and doctor were on duty in school on the day following immunization for the purpose of inspecting rashes and other signs of reactions.

6. Printed notices were given to parents at the time of the first injection advising them of some of the reactions that might occur and assuring them that there would be no cause for alarm.

7. Every child absent from school following an immunization treatment was visited by the school nurse.

8. Since all children, no matter how severe the reactions, made a complete recovery, it was finally decided not to have the nurse

follow up such cases in the homes. Whenever possible, school immunization clinics were conducted on a Friday afternoon to reduce school interference to a minimum.

REACTIONS

By interviewing pupils, teachers, and parents, nurses, obtained as much information concerning reactions as possible. Reactions were classified as: severe systemic, moderate systemic, mild systemic and local reactions. Children with a temperature of 102°, prostration, vomiting, and diarrhea were reported as having severe reactions; those with lassitude, a noticeable rise in temperature, some nausea and vomiting, rash, and muscular pains, as having moderate reactions; and those with a rash and a slight rise in temperature, as having mild reactions. Local reactions consisted of redness and swelling of the arm and some local pain.

According to this classification, the average percentage of reactions for the 5 doses is as follows: severe systemic 3 per cent, moderate 15 per cent, mild 16 per cent, local reactions 23 per cent, and no reactions 43 per cent. The 3rd and 4th injections were followed by the most severe reactions. Two or three children who received the larger doses of toxin by mistake, showed no unusual reactions. All children recovered completely from all reactions, and most of them within 24 hours. About 20 per cent of the children developed a rash after the 2nd, 3rd or 4th injections.

Parents as a rule did not worry about reactions when forewarned. Health departments and physicians who have not the confidence of parents, will find it more difficult to immunize children against scarlet fever on account of the many severe reactions.

RESULTS

The immunization of 6,000 children in a city of over 600,000 population

cannot be expected to check a city-wide scarlet fever epidemic, although such immunizations did not slow up the epidemic temporarily. The immunization work immediately controlled scarlet fever in those schools in which a large percentage of children accepted immunization. The immunized schools were almost completely free from scarlet fever during the year 1934, after the 2nd injection of toxin. During 1935, scarlet fever again occurred in these immunized schools among the kindergarten and 1st grade children who did not attend school in 1934 when immunization was done.

Schools with an attendance of 14,286 children in which immunization was done, had 1,102 cases of scarlet fever from January 1, 1934, to July 1, 1935. Similar unimmunized schools with the same attendance had 1,550 cases during the same period.

Twenty-four cases of scarlet fever occurred among 800 children who had only 1 dose of Dick toxin—14 within the first week after the injection. Nine children of 600 who had 2 doses; 12 of 900 who had 3 doses; 2 of 740 who had 4 doses; and 14 out of approximately 6,000 receiving 5 doses of toxin, contracted scarlet fever. Thirteen of the 14 came down with scarlet fever several months after they had been immunized. Nine of the 14 were verified by Health Department diagnosticians. All of them had had negative re-Dicks. Thirty-six children with negative Dick tests and without immunization treatments contracted scarlet fever. Twenty-four of these contracted the disease 3 months after having had a negative Dick. The scarlet fever rate for completely immunized children is about 2.3 per 1,000, while the rate for the elementary school population of 87,000 is approximately 60 per 1,000.

It should also be mentioned that 5 of the 14 cases, among completely im-

munized children, were secondary cases in families. Children who were immunized against scarlet fever had approximately the same percentage of hemolytic streptococci carriers among them as did the non-immunized children. This percentage was 20 in the immunized children and 18.5 in the non-immunized—all in the same school-rooms.

Scarlet fever in children's institutions in the city as well as in the county of Milwaukee was effectively controlled by means of the Dick test and scarlet fever toxin. If the immunization program started in March, 1934, had been continued until all schools had been immunized, there is every reason for believing that the epidemic would have been controlled much sooner than it was. A larger immunization program in schools was not conducted due to lack of funds and lack of support on the part of a large percentage of family physicians.

NOSE AND THROAT CULTURES

Another procedure which the Milwaukee Health Department adopted during its campaign, was the culturing of noses and throats for hemolytic streptococci. All children in rooms that had more than 2 cases of scarlet fever reported within 1 week, were cultured. Later on, kindergarten and 1st grade rooms were cultured whenever 1 case of scarlet fever occurred. Children who were absent from school 3 or more days were visited by the nurse and cultured. Such absentees were isolated at home for 10 days if found to be carriers. Homes of carriers were not placarded but the Police Department assisted the Health Department most successfully in keeping carriers at home.

Approximately 6,000 children of 25,000 cultured, were found to be positive for hemolytic streptococci. Absentees averaged about 25 per cent

positive, while room cultures averaged 22 per cent. It is not easy to determine the value of this tremendous amount of culture work. After culturing for several weeks during the spring of 1934, it was decided that the exclusion from school-rooms of hemolytic streptococci carriers was not of sufficient value as a control measure to justify its continuance.

This decision was based on the fact that the number of new cases reported did not show any decrease. Almost immediately, however, when the procedure of culturing infected rooms was discontinued, the number of cases increased very rapidly. Children who were excluded from school as carriers show a scarlet fever rate of 19 per 1,000 for the 10 day exclusion period; children not excluded because negative for hemolytic streptococci have a scarlet fever rate of 21 per 1,000 for the 10 day period after their cultures were taken. This, of course, would lead one to believe that children with positive throats were less apt to come down with scarlet fever during the 10 day exclusion period than those with negative throats remaining in school.

Families having scarlet fever carriers, had a scarlet fever disease rate of 11 per 1,000 for other members of the family during the 10 day exclusion period, compared to 5 per 1,000 in families where the school children had negative throat cultures. It would seem, therefore, that the advantage, if any, of excluding scarlet fever carriers from the classroom is not in having them out of school while they are coming down with the disease, but rather to eliminate them for a 10 day period as carriers.

The percentage of negative and positive cultures not only seems to vary according to classes and schools, but also according to the nurse taking cultures. In taking cultures of former scarlet fever patients, individual nurses

varied from 5 to 60 per cent in obtaining positive cultures. The carriers in various groups of former scarlet fever patients are as follows: in the 90 per cent apparently in good health, 40 per cent; in the 20 per cent that had their tonsils removed, 40 per cent; in the 30 per cent that had congested throats and diseased tonsils, 46 per cent; in the 2.5 per cent apparently in poor health, 55 per cent.

In spite of the questionable value of culture taking as a scarlet fever control measure, the Health Department decided to culture infected rooms again when the disease seemed to be beyond control, in January, 1935. After culturing rooms for several weeks and excluding all carriers, a very slow gradual decrease of cases was noticeable. However, the improvement was not sufficient to inspire much confidence in the procedure. My personal opinion is that a certain number of exposures are prevented through the isolation of hemolytic streptococci carriers, and during an epidemic such a procedure is justifiable even though it is very time consuming. Due to the tremendous number of hemolytic streptococci cultures examined, including the preparation of media and other necessary supplies, it was not possible with the available staff to determine the specificity of the hemolytic streptococci, by serologic, biochemical, or toxicogenic reactions.

QUARANTINE

The value of quarantine during a scarlet fever epidemic in a large community is becoming more questionable every year. I am wondering whether absolute quarantine of entire families for scarlet fever should not be put in a class with fumigation, in which the public and health officers had so much confidence a few years ago. No one will deny that quarantining of scarlet fever patients will prevent some ex-

posures, and at least delay some infections, but during an epidemic it is almost worthless, as far as tangible results go. The quarantining of entire families for several weeks is not only a great inconvenience, but also such a tremendous economic loss for health departments as well as the families, that I am beginning to wonder whether the results justify the effort and expense. The state law in Wisconsin requires that scarlet fever cases be quarantined at least 28 days from date of report. In November, 1934, the State Board of Health gave the Milwaukee Health Department permission to shorten this quarantine period to 21 days for mild cases having two consecutive negative nose and throat cultures. Since a large majority of the cases were very mild, it happened that approximately 70 per cent of all patients were eligible for 21 days release cultures; 32 per cent had negative cultures within 24 days, an additional 24 per cent in 28 days, 15 per cent were positive and 29 per cent were not cultured. This shortening of the quarantine period increased the capacity of the isolation hospital and in that way helped prevent additional cases in homes.

According to a special study, 56 secondary cases developed within 2 weeks after release from quarantine of 2,828 cases; 1,142 cases released in 3 weeks had 30 secondary cases, or 2.7 per cent; 1,457 cases released in 4 weeks had 19 secondary cases, or 1.3 per cent; 229 cases released in 5 weeks and over had 7 secondary cases, or 3 per cent. Quarantine regulations were enforced more rigidly than during normal times. Daily lists of quarantined families were sent to the Police Department who kept a very close watch on all such homes.

It is generally believed that quarantine during an epidemic is not so effective as it should be on account of there being too many undiagnosed and un-

reported cases that are responsible for the continuance of the epidemic. This is partly true, yet the undiscovered cases alone cannot account for many of the unusual experiences associated with scarlet fever. Scarlet fever is endemic in many communities and epidemic every few years. Such endemics and epidemics can only be explained on the basis that every large community has a high percentage of susceptibles as well as carriers. By means of the Dick test it is possible to determine the percentage of susceptibles in any community. By means of nose and throat cultures, we can, at least to some extent, determine the number of hemolytic streptococci carriers.

In culturing the noses and throats of former scarlet fever patients on 2 consecutive days, we found approximately 43 per cent positive for hemolytic streptococci. This percentage did not seem to vary much in patients who had been released from quarantine, 1, 2, 3, and 4 months previously. Forty-three per cent of carriers in former scarlet fever patients must be given some consideration regardless of whether we are dealing with a scarlet fever hemolytic streptococcus or some other strain.

It can readily be seen that very little is gained by quarantining a patient while acutely ill in bed for 3 or 4 weeks, and then releasing him when he is well enough again to mingle with the public, even though he may be just as infectious after his release as he was during quarantine. This high percentage of carriers among former scarlet fever patients accounts for many of the hitherto puzzling experiences. During the latter part of September, 1934, when scarlet fever started up like a conflagration, we were inclined to believe that many unreported cases during the summer months were responsible for this tremendous increase.

While we know that a few children

who had only recently had unreported scarlet fever probably did return to school, we also know that the number was not sufficient to account for the explosive outbreak soon after schools opened. The increase no doubt was due to the fact that there was still a large percentage of children susceptible, and hundreds who had had scarlet fever during the previous months were still carriers of virulent scarlet fever hemolytic streptococci.

This large percentage of carriers among former patients explains many secondary cases months after the original case occurred. This also accounts for the fact that health authorities find it difficult to agree upon the length of quarantine. It can readily be seen that if a large percentage of these patients are infectious for months after their acute illness, it does not make a great deal of difference whether they are released at the end of 2, 3, or 4 weeks. The only difference is that some exposures will be delayed a week or two longer, but not entirely prevented by quarantine. Releasing by cultures cannot be considered too satisfactory, although I believe that it is an aid in keeping in some carriers a week or two longer. Approximately 25 per cent of all patients who showed 2 consecutive negative cultures when released, again had positive cultures at least once during the following 5 months. Only 15 per cent of positive cultures changed to negative within 5 months after the patient was released from quarantine.

While I realize that most of the statistics based on cultures for scarlet fever hemolytic streptococci are of questionable value, nevertheless, when such statistics fit into our epidemiological experiences, we should not hesitate to give them consideration.

CLOSING OF SCHOOL-ROOMS
In spite of the Health Department's

efforts to control the epidemic with immunization, culturing, and quarantining, it became more threatening every day. The situation appeared so critical that only drastic action could prevent the loss of many lives. Scarlet fever cases were being reported at the rate of approximately 300 per week, and measles had reached 600 per week. Several children had died with a combination of scarlet fever and measles.

After a conference with representatives of schools, churches, theatres, the Association of Commerce, and the medical profession, it was decided to isolate all children under 7 years of age in their homes for 4 weeks. This was later extended to 6 weeks.

The reasons for isolating this age group are obvious, and I will not take time to mention them. The order of the Health Department excluding children under 7 years of age from schools, churches, theatres, Sunday schools, and all other public places, with the exception of stores when accompanied by parents, went into effect February 18, 1935. Some of the more important results obtained are as follows:

1. Scarlet fever, measles, German measles, and chicken pox continued to increase for the length of their incubation periods, namely, 1 week for scarlet fever and 2 weeks and slightly over for measles, German measles, and chicken pox. This proved that very few cases, if any, were unreported as soon as these children left school. Parents were scarlet fever minded and very few of them failed to call a doctor when the younger children showed signs of illness.

2. The percentage of scarlet fever in children under 7 years gradually dropped from 34 to 18 of the total cases reported. This low percentage continued several weeks after the children again returned to school, but gradually went up to its normal by the time schools closed in June. Forty per cent of scarlet fever in the isolated children could definitely be traced to other scarlet fever patients, over 7 years of age, in the home.

3. The total number of new scarlet fever cases reported began to decrease toward the

end of the first week of the ban and continued to decrease quite rapidly from 300 per week to 51 at the end of the school year.

4. Measles, like scarlet fever, showed a large total decrease at the end of the incubation period and also a large percentage decrease in children under 7 years of age. The decrease in rubella was not quite so spectacular as that in measles because this is a much more common disease among adults than is measles.

Chicken pox, which was very low when the ban went into effect, decreased to an insignificant number. The decrease in scarlet fever, measles, German measles, and chicken pox during this isolation period was not general throughout the state or in communities near Milwaukee. While these diseases decreased in Milwaukee, they were increasing throughout the state. Some of the smaller communities reported more measles and chicken pox in their weekly reports to the State Board of Health than did the City of Milwaukee.

5. At the end of 6 weeks, when approximately 20,000 children under 7 years of age returned to school, there was no significant increase in cases of the diseases mentioned before. Had some cases been covered up, the opening of schools would have uncovered them. Three weeks after the children returned to school, measles, German measles, and chicken pox began to show an increase. During February, 1,569 cases of measles were reported; 1,159 in March, 914 in April, 1,475 in May, and 2,046 in June. Ordinarily during an epidemic the peak in measles is in April. This year it occurred in June. By postponing measles in hundreds of children until warmer weather appeared, it is probable that some lives were saved.

During the first 3 months of the year, there were 3,500 cases of measles with 5 deaths. Since that time up to July 1, there have been reported over 4,400 cases with only 2 deaths. While the closing of an entire school system in a community may be neither practical nor effective, nevertheless, there is no doubt in my mind about the practicability and effectiveness of isolating children under 7 years of age during a serious epidemic. By taking almost 25 per cent of the elementary school population and almost 50 per cent of the total child population effec-

tively out of circulation, any community can at least temporarily check epidemics of childhood diseases.

Children under 7 years of age are the most susceptible and the most exposed to contagious disease. They are the foci of most epidemics. It must not be forgotten, however, that the isolation of children under 7 years of age must be carried out just as intelligently and scientifically as any other epidemiological procedure. To obtain satisfactory results, children must be isolated for at least 1 month and preferably 6 weeks to 2 months.

School and health authorities have so many times stated that schools with medical and nursing supervision are the safest places in the world for children, that they are apt to believe it regardless of what may happen to the children during an epidemic. There is nothing gained by assuming that nurses and doctors can pick out all scarlet fever cases and carriers by daily or weekly classroom inspections or home visits, when we know that this can only be done when children have perceptible signs or symptoms of the disease.

CONCLUSIONS

1. Immunization against scarlet fever with 5 doses of Dick scarlet fever toxin, is both effective and safe. Even children having only 2 doses had a case rate of 15 per 1,000 compared to 60 per 1,000 for the unimmunized school children. Fear of reactions no longer justifies the opposition of private physicians and health departments to scarlet fever immunization.

2. Nose and throat cultures for the control of scarlet fever carriers may prevent some exposures and infections, in spite of the many uncertainties of this procedure.

3. Strict quarantine of scarlet fever patients prevents neither epidemics nor epidemics, because too many patients remain carriers after release from quarantine. An absolute quarantine of entire families is probably responsible for more additional cases than the proper isolation and quarantine of only the patient. Scarlet fever quarantine is based more on tradition and expediency than on scientific facts.

4. The strict isolation of all children under 7 years of age for 6 weeks during a scarlet fever epidemic not only reduces the number of scarlet fever cases, but also aids in the control of other childhood contagious diseases. The permanency of this improvement depends upon the percentage of immunes produced by the epidemic and immunization.

Public health officials have reason to point with pride to achievements in typhoid fever,

smallpox, and diphtheria control, but when it comes to the control of scarlet fever, they have been too easily satisfied with large and attractive isolation hospitals and the annual imprisonment for a period of 3 to 6 weeks of thousands of our most law abiding families.

More money for immunization and less for contagious disease hospitals should be the slogan of all progressive health departments.

The Will Rogers Memorial Fund

THE press has carried the report that, among thousands of suggestions made by contributors to the Will Rogers Memorial Fund, more persons have suggested that a hospital be founded in his memory than any other plan. Among the suggestions sent to the trustees is that for a well rounded health center which might conceivably represent the fine human qualities of Will Rogers fully as well as any hospital. Through a health center people might be kept well enough to enjoy fully the wit and humor for which he was so noted.

Would it not be a desirable direction in which to attract public interest if health workers everywhere in making contributions to this fund would pass along the suggestion for some activity related to the health program, such as this health center?

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DR. PARK IS AWARDED THE ROOSEVELT MEDAL

IT is not medals, or public episodes of recognition which give distinction to such persons as Dr. William H. Park, but the enduring appreciation they have won from their professional colleagues. And yet there is for all of us a glow of confidence in the essential rightness of matters in our contemporary life when such a physician is singled out from the many contributors to science for the honor of the Roosevelt award on October 27, the 77th anniversary of the birth of Theodore Roosevelt.

Embryo-laryngologist, microscopist, bacteriologist, sanitarian, medical educator, publicist, teacher of a long succession of health commissioners, crusader for child life, consulted by half the world, and held in affectionate regard by every physician so fortunate as to know him, Dr. Park has earned any and all distinctions which may come to him.

The medical literature of almost a half century contains the record of observations, experiment, lessons learned and taught, in the career of Dr. Park, and it would be a superfluous indulgence to select and name the steps in progress toward complete knowledge to be read in the titles of fundamental and supplementary contributions from his hand.

This gentleman of science, a very perfect knight of bacteriology, belongs to that choice company so ably conceived by the late Arthur Little as a "fifth estate, composed of those having the simplicity to wonder, the ability to question, the power to generalize, the capacity to apply; in short, the company of thinkers, workers, expounders and practitioners upon which the world is absolutely dependent for the preservation and advancement of that organized knowledge which we call science."

The simple directness of method, the clarity and utter frankness of report, the invariable readiness to listen to objections, to accept evidence, to be more

than generous to the work of others, to bring forth the creditable work of associates, all have combined in his scientific manner to make Dr. Park's presentation of a report or his participation in a discussion an occasion as refreshing as it is always enlightening, a true intellectual exhilaration, giving confidence in the continuing value of the professional platform as the tournament half of medical progress.

To those concerned in the social application of medical discoveries and the useful established facts of biological and medical knowledge through the instrument of civil government at tax payers' expense, Dr. Park's contribution in maintaining the first and most eminent municipal laboratory of diagnosis and research for 42 years free from the malign influences of political corruption and technical deterioration, is almost as stately a monument to his quality as citizen and director as have been his mastery of preventable diseases.

It has been not only through the good fortune of circumstances but as a result of the application of a consistent and sustained philosophy of study, controlled observation, experiment in test-tube, animal cage, institutions, and the homes of the city, that Dr. Park has found in his own hands and created to meet each probable need that entire and complete series of resources upon which progress from theory to practice, from hope of life saving to tangible proof of its successful accomplishment are based.

If it were not enough to have added generously to the extent and precision of human understanding of the specific causes and associated factors concerned with the prevalence of communicable diseases, and to have carried to unbelievable success the mass application of specific measures for their wholesale prevention and control, and to have built an enduring structure of precedence and procedure for the administrative officers of health in all lands to intimate and add to, his position as teacher, as trainer of other directors of laboratories or searchers in the border-line of knowledge, as demonstrator to practitioners in medicine in a thousand communities of the way to carry new skills of diagnosis and immunity into the homes of the nation, would still be eminent and of high degree.

If and when retirement from service to his city be demanded by the exigencies of municipal ordinance, Dr. Park will continue in his position as leader in the science and art of public health, held in admiration and affection by the entire membership of the American Public Health Association.

FIFTEEN YEARS OF ADMINISTRATIVE HEALTH PROGRESS

A MILESTONE in public health progress was the appointment by the American Public Health Association in 1920 of a Committee on Municipal Health Department Practice, since 1925 known as the Committee on Administrative Practice. This committee was charged with the "preparation, study, standardization, and presentation of scientific public health procedures, by the collection of information in regard to current administrative health practice, the analysis of the material obtained to derive standards of organization and achievement and the translation of these standards into terms of concrete achievement through an information and field service."

Fifteen years ago there was a striking lack of authentic information in regard to the practice of health departments. A health officer may now review his problems and program in the light of experience in other communities and apply

PUBLIC HEALTH EDUCATION*

Why Not in November Issue?—This section failed to appear in the November, 1935, issue because no copy had been prepared during the week preceding the Milwaukee meeting.

Health Education Fared Well at Milwaukee—We had space for Health Education Headquarters such as we have had only at Pasadena. . . . Section meetings were well attended . . . with some good material presented for publication in the *Journal*. The Institute drew another new group many of whom were new to the Annual Meeting. The annual session of the Section gave thoughtful consideration to several important matters. Several staff members of Milwaukee Health Department rendered much faithful and effective service in connection with Health Education Headquarters. . . . Everything was lovely except the meeting rooms in the Auditorium which distorted voices and made much of the talk practically unintelligible.

Headquarters Program at Milwaukee—An experiment this year was a program of demonstrations. Included were electrical transcriptions of radio plays, presented by T. C. Stowell, of New York State Dept. of Health.

Scientific and popular 16 mm. motion pictures received from various sources were projected by Eastman Kodak Stores of Milwaukee. "Contacts," a talkie from Hennepin County Tuberculosis Assn., Minneapolis, was put on one day.

The new A.M.A. dramatic broadcast was received on Tuesday afternoon.

Slidefilms from the Society for Visual Education were shown daily.

However, the program was not a success because the attendance at Health Education Headquarters was scattered too widely throughout the day to secure satisfactory audiences for program events.

Education Headquarters at Milwaukee—The collection of classified portfolios was supplied by Social Work Publicity Council, 130 East 22d St., New York, N. Y.

In response to the invitation mailed to A.P.H.A. members a variety of additional material was received for display. Among those represented:

Health Service of Canadian Medical Assn. New York State Dept. of Health. International Society for Crippled Children. Bureau of Dental Hygiene of University of Iowa. Milbank Memorial Fund. Baltimore Health Dept. Milwaukee Health Dept. American Social Hygiene Assn. National Health Council. American Physical Education Assn. Buffalo Museum of Science. American Medical Assn. Massachusetts Dept. of Public Health. National Organization for Public Health Nursing. New Mexico Bureau of Public Health. Foreign Policy Assn. Cattaraugus County School Health Service. Nassau County Tuberculosis and Public Health Dept. Brookline Health Dept. Physical Education Health and Recreation Digest. Good Teeth for Children Council. *National Parent Teacher Magazine*. Wisconsin Anti-Tuberculosis Assn. Westinghouse Electric and Mfg. Co. Evaporated Milk Institute. Dairymen's League. Pictorial Statistics, Inc.

Scientific Exhibits at Milwaukee—The *News Letter* has taken the

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

story to all A.P.H.A. members, but these paragraphs are added to complete the record.

Due to the faithful persistence of Chairman Homer N. Calver, the Scientific Exhibits have grown in number, variety, and significance.

This year judges Hiscock, Connolly, and Norton gave citations of merit to certain displays for specified features which seemed to call for special mention.

Again Too Many for True Teaching—With an average session attendance of 125 to 140, the Health Education Institute was too large for effective teaching purposes. But there was one splendid gain. Announced as being for rural and small city workers it was the most homogeneous group yet gathered for the Health Education Institute.

Why not in 1936 experiment in having two or more institutes for specialized groups? Various state conferences of social work conduct from six to a dozen or more institutes. In most states only 25 may be enrolled. If more wish to enter a certain institute an additional leader is secured and another group of 25 is provided for.

How Do They Get That Way?—Again at Milwaukee half of those who turned up for the Health Education Institute had not registered in advance.

And, of course, every one suffered. Adequate planning was impossible.

Shall We Call It That Way?—Under "What Shall We Call It?" we submitted to our readers some of the "Definitions of Terms in Health Education" then under consideration by American Physical Education Association. (See *Journal*, for April, 1935, pp. 491-492.) Since then the report has been approved by A.P.E.A.

The committee of A.P.E.A. did an excellent piece of work. Probably after

careful examination we will find that the definitions and the accompanying interpretations and applications will fully serve the purposes of the Public Health Education Section.

The terms defined: health education, school health education, public health education, hygiene, sanitation, health, health instruction, health service, healthful school living, health examination.

Terms which have outgrown their usefulness: health supervision of school plant, health supervision of school processes, school hygiene, medical inspection, school health program, etc.

For a reprint of the full report address American Physical Education Association, 311 Maynard St., Ann Arbor, Mich. 5 cents.

Cutting House Organ Costs—*Alabama's Health* is published by Alabama Tuberculosis Association, Birmingham, Ala. It is sent to 200 Christmas Seal sale workers, health officers, local tuberculosis association presidents, etc.

The little magazine is reproduced by planography, one of the names given to offset printing, as explained under "Many Names for a Single Process," in the *Journal*, Sept., 1935, page 1045.

Acting Executive Secretary K. W. Grimley sends the following statement and will be glad to answer questions:

Copy is carefully typewritten with a heavy ribbon on sheets of paper slightly larger than the final size. (Any size original may be employed and the typewriting reduced to any desired extent.) Headings are typewritten with the same typewriter employed for the body type. These heads are then enlarged by photostat to an appropriate size, cut and pasted in place on the final typewritten draft sent to the publisher. Likewise illustrations are cut and pasted on the final copy. This final copy when completed is sent to the publisher and photographed, the photograph being the basis of the reproduction process. Pages are delivered to us flat and are hand folded and gathered by us.

The total cost of each of our issues is about \$15; approximately one-quarter the equivalent cost of printing. Any typewritten or printed material may be used in the process. Original photographs however must be screened before use; an operation which entails an expenditure of about one-half the cost of equivalent engraving. All our illustrations are clipped from magazines and circulars and are reproduced without any additional charge.

Municipal Broadcasting Station Not Afraid—The National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y., reports a radio talk on "Foresight Saves Eyesight" in which syphilis was discussed.

Speaking over Station WNYC, New York municipally owned station, C. Edith Kerby of the National Society staff said:

Probably the most serious of all infectious diseases which may result in blindness is syphilis. This disease can affect the eyes in ways too numerous to be described here, except to say that every one of them is serious. Unlike any of the other infectious diseases, it can even be passed on to a baby before it is born, so that the child may come into the world with seriously defective or blind eyes, or it may apparently be healthy but carry in its system the germs which will attack its eyes several years later.

The method of diagnosing this disease by means of a blood test should be more generally used by physicians, since many of its victims may not be aware that they have syphilis or have been exposed to it. For the prevention of much unnecessary blindness and other defects in children, the National Society for the Prevention of Blindness urges the use of a routine blood test for all pregnant women to discover and treat mothers who need treatment.

How New Ideas Grow—Without benefit of psychological terms a business man outlines the process of growing ideas. Here are the five steps:

1. Formulate your objective.
2. Think in simple terms.
3. Be intelligently ignorant.
4. Discipline imagination.
5. Stop thinking.

The very first one is not as simple

as it reads. Much health education may be undertaken without an objective, much less one that is clear-cut and shaped to the plans under way.

Says the author:

The next step is the hardest. If you don't believe it, try to speak in clear, concise, simple words. Listen to others. Successful men have learned to think in fundamentals. It is at least a partial explanation of their success. It should be possible to reduce the most complex problem to simple terms. If it isn't, facts are lacking.

The third step implies a willingness, or better, an eagerness to learn. It is not difficult to feel that one "knows all about" one's organization, the people to be reached, the technics of the job, and so on. Eagerness to learn goes hand in hand with skill in learning. The writer says:

. . . intelligent ignorance confines questions to the problem at hand. At the same time it includes the simple "what, why, and when," for nothing is taken for granted.

To discipline the imagination is to avoid "danger ahead."

As one learns to think in terms of fundamentals, and as intelligence is used in satisfying curiosity, imagination begins to work. Immature or false conclusions are the dangers to be avoided at this point. Beware of flying too far from an earthy sense of values. . . . A new way of reaching a goal is not necessarily important. Neither is an old method necessarily sound. Imagination must not be allowed to lose sight of facts or fundamentals.

And now, most difficult of all is the stop thinking step. Give your mind a chance to work for you. Drop the subject. Lay aside the manuscript. Do other work, or read or play. When you get back to your problem the idea is likely to come, and it is likely to be a sounder proposition than if there had been no interval. In "New Ideas and How They Grow," by C. S. Kauffman. *Advertising and Selling*, 9 East 38th St., New York, N. Y. Nov. 7, 1935. 15 cents.

Lay Education against Cancer—

A large part of the annual report of the American Society for the Control of Cancer is devoted to professional and lay education. The Society has been making wide use of wax models, charts, and film strips. As many as 90 copies of film strip have been made.

Lay education, both direct and through numerous coöperating groups, has been widespread. The society supplies newspaper material and radio talks for local use.

An important development is the addition to the staff of Mrs. Carl B. Illig, Jr., for field work. Mrs. Illig has served as chairman of the Committee on Hygiene and Public Health of the General Federation of Women's Clubs.

In *Bulletin*, American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y., Oct., 1935.

What Should an Assistant in Health Education Know?—A precedent has been set (at least, so far as we know it is a precedent) in a recent civil service examination in New York City, for an assistant in health education (publicity worker). The examination sheet brackets "publicity worker" in just this way.

We print below the 4 questions which the applicants were asked in the written examination. Question 3 relates to a one-page article on rickets which was supplied.

1. Choose one of the following health problems—

- (1) Prevention of cancer
- (2) Prevention of tuberculosis
- (3) Prevention of malnutrition

which you believe to be of importance in one of the following districts in New York City which you select and locate

- (1) A district populated largely by colored people
- (2) A district populated largely by people of foreign birth
- (3) A district populated largely by the "white collar" class

(a) Tell why you believe the people in the district selected should be informed concerning the problem chosen.

(b) What agencies and associations (national and local), because of their special knowledge or interest in the problem, might be helpful to the department in planning an educational campaign in the district?

(c) Mention some local agencies or organized groups in the district through which the health department might wish to work in order to reach the people with educational materials and ideas. (Exact legal titles are not required.)

(d) List and number the important basic facts about the problem you would wish to convey to the people of the district.

(e) What action would you wish the people to take with regard to the problem?

(f) What incentives or persuasive suggestions would you employ to get people to take the desired action?

(g) What publicity and educational media or other channels of reaching people would you use, assuming that the budget for this purpose is limited but not stinted?

2. To carry out certain health protective procedures for children, it is necessary to secure the consent of the parents. Among these are

- (1) Consent to remove child's clothing to make a physical examination in school
- (2) Consent to make a tuberculin test
- (3) Consent to administer toxin-anti-toxin or toxoid

Select one of these consents for consideration.

(a) Mention the objections to it commonly raised by parents.

(b) Frame answers to these objections.

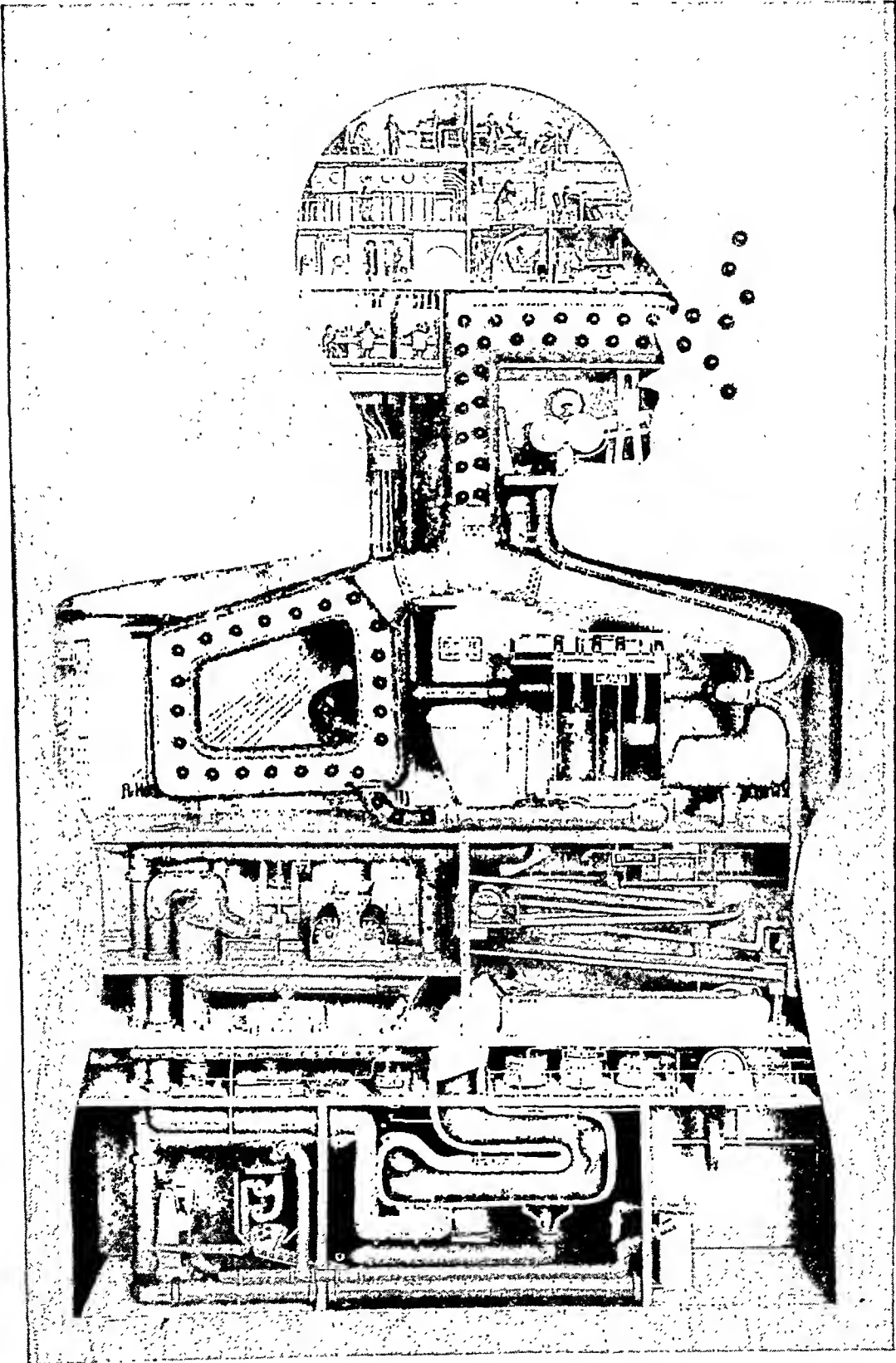
(c) In a community where the procedure you selected is to be introduced, what would you suggest be done in advance to secure a high percentage of consents?

(d) A mother has written the health department that her medical advisor, who is an osteopath, has advised against the procedure. She is foreign born, but understands simple English. Write a short letter in answer to hers.

3. Using the article on Rickets as a basis and supplementing it by your own knowledge, write a 500 word first-draft manuscript entitled "Rickets. What It Is and How to Prevent It."

The article should be suitable for publication in booklet form and is intended for distribution to mothers of medium intelligence.

4. Assume that a rumor that poliomyelitis threatens the city is disturbing people, that



THE MACHINE AGE IN MAN

it is true that a few more cases than usual have been reported in the past month, but that, to the best knowledge of the health commissioner, there is no immediate threat of an epidemic. Assume also that the early symptoms of poliomyelitis are often vague or resemble those of some relatively harmless condition, that early diagnosis is advantageous both to patients and to the public, and that people have heard much about a certain curative serum the value of which has not yet been proved.

Write a 3 minute radio talk designed to allay needless fear and also telling people what precautions to take.

Syndicated Health Articles—"The Annual Directory of Features" appears in *Editor and Publisher*, Times Building, New York, N. Y., Sept. 28, 1935. 10 cents.

Health material appears under "The Debunker," "Family Doctor," "Health and Beauty," "Health Article," "Health Column" (Clendening), "Health" (Fishbein), "How's Your Health?" (Galdston), "Medical News" (Science Service), "Personal Health Service," "Secrets of Health and Success," "That Body of Yours," "Your Child's Health," "Your Good Health," "Your Health" (Copeland), "Your Weight and Your Height."

In addition to the above there are features on mental hygiene, child care, beauty, food, and psychiatry.

The Machine Age in Man—In Cabana Hall of Man, Buffalo Museum of Science, has been installed the "Human Factory," a three-dimension exhibit reproducing the well known diagram which came to us from Germany some years ago. The model is animated. Cogs move, wheels revolve, pumps operate, red and blue lights show the course of air.

This model represents, in terms of ordinary factory practice, the various operations essential to maintain life in a human being. The normal functions of the human body are directly comparable to the operations of a manufacturing plant. Certain raw materials

(food and air) are taken in, treated in order to serve a definite purpose. The only difference between the Human Factory and man-made factories is that the former uses all its products within the four walls of the body; a man-made factory ships its products for use elsewhere. In the cranium is located the office of the Human Factory. Here are the centers of judgment, intelligence, hearing, seeing, will power, motion, and feeling, corresponding to a factory's conferences to determine policies, telegraph department, mailing room where orders are received, department of production control, telephone switchboard which ties organization together. Processes in torso show what happens to raw material. This model was made in the Division of Preparation, Buffalo Museum of Science, under the direction of Dr. Carols E. Cummings, director.

Extent of Rural Health Service—A lot of state and local health workers should be able to make good promotional use of "Extent of Rural Health Service in the United States, Dec. 31, 1930-Dec. 31, 1934," in the *Public Health Reports*, Washington, D. C., Nov. 1, 1935.

Here are listed counties, townships and other districts directed by whole-time local health officers and maintained by local or state funds. A map and a diagram reinforce the lists.

What Actually Is Being Done?—We have heard rumors of federal funds being spent on health education. We have seen one very preliminary memorandum. But nothing more. Will any one in Washington or in any of the states help us to an intelligible statement for the readers of the *Journal*? Or suggest who can supply the necessary information?

Health Education in September, 1935, Journal—In "Sanitation in the Holy Land," by Mendelsohn (pages 997-998): descriptions of the first Palestine Health Week, and a Health Exhibition in 1924.

In "Sanitary Survey of Beverage

Establishments," by Mallmann and Devereux (top of page 1014): education of proprietors.

In "Books and Reports" see pages 1055, 1057, 1058, 1059, 1060.

"A Word to the Thrifty" (page 1067), plus diagram on the opposite page should interest many of our readers.

Health Education in October, 1935, Journal—"Health Information on the Air," by Blanchard (pages 1031-1088), reports a study of health education by radio, around San Francisco Bay. May suggest a project for other districts, for health councils or other groups.

"New Germany Teaches Her People," by Kleinschmidt (pages 1108-1113) (illustrated): tells of hygiene exposition; records some impressions; and raises some important questions.

"What Is Public Health?" by Hill (page 1134).

In "Books and Reports" (pages 1154-1162) are several reviews of interest.

Hygeia, October, 1935—Published by American Medical Association, 535 N. Dearborn St., Chicago, Ill. Here are selected items appearing in Oct., 1935, issue:

Prevention and treatment of goiter (first of three reproductions of radio talks). Caffeine and health (part 1). Care of contagious disease in the home. The physician in literature (books by and about physicians). Speech problems and speech care. Health of our navy at sea. The case of the man who exploded (a doctor's mystery). Health education through models (illustrations from Buffalo Museum of Science). Sir David Bruce (a pioneer scientist). Child guidance clinic. Some diabetes "cures" and "treatments." Surgical conditions in children (radio talk). This thing called dentistry. What about your child's feet? A modern Aladdin's lamp: how germs travel. Health news pictures. Books on health. Questions and answers.

In "School and Health":

Opportunities for health teaching in the curriculum. Health teaching in October. Solving health educational problems. Safety problems through the years in Boston public schools. Rest and nutrition class (Boston). Training for good posture. New health books for teachers and pupils.

BOOKS AND REPORTS

Preventive Medicine and Hygiene—
By Milton J. Rosnan. (6th ed.)
New York: Appleton-Century, 1935.
Price, \$10.00. 1,481 pages.

The 6th edition of this standard work has come to us with the statement that it is "extensively rewritten and entirely reset, much new material has been added and much dead wood deleted."

One misses familiar landmarks. In the Table of Contents we look in vain for Malta Fever, though fortunately it is still found in the index. The term Undulant Fever covers the many names under which the disease has been known.

Diseases are arranged in groups according to their general method of spread. This is good as far as it goes, but there is still a group of some 18 diseases (if snake poisoning can be considered a disease, as the author considers it) which are classified as "miscellaneous." Section II begins with venereal diseases and devotes chapters to sex hygiene, contraceptives, heredity, drug addiction and mental hygiene—certainly a mixture.

It is not until we reach the middle of the book that we come to Section V, which considers Public Health Principles and Practice, and the rest of the text is devoted largely to what is generally considered public hygiene—food, air, soil, water, etc.

Another change, which can hardly be considered an improvement from the reader's standpoint, is the moving of references to the end of sections instead of giving them at the foot of the page, as in the 5th edition.

We wish that the rewriting and deletion of dead wood had gone far

enough to remove the statement on page 16 that young bovine animals used for the production of vaccine must be examined to determine the absence of glanders. This blunder has appeared in edition after edition. On page 380, under the head of Glanders, the correct statement is made that cattle are immune to this disease.

The section on Tuberculosis is one of those mentioned as having been "largely reorganized." The discussion of the human and bovine varieties of the tubercle bacillus leaves much to be desired, and on page 31, the statement in regard to the comparative virulence of the two makes one wonder just what is meant.

On the whole, the book maintains the high standard set by former editions. It has grown almost too large to be used as an ordinary text, considering the time allotted in most medical schools to the teaching of hygiene. The book contains a wealth of information and will unquestionably maintain the position it has held through some 22 years as a standard reference. The printing and binding are excellent. MAZÏCK P. RAVENEL

Diet and Physical Efficiency—*By Howard W. Haggard, M.D., and Leon A. Greenberg, Ph.D. New Haven: Yale University Press, 1935.*
180 pp. Price, \$3.00.

This monograph attacks the fatigue question with strong emphasis upon a neglected viewpoint—nutrition. Quoting from the descriptive cover we read:

Howard W. Haggard and Leon A. Greenberg believe that the quantity and the quality of food have received a great deal of attention in recent years, but that the dis-

tribution of diet in time has not received the attention it deserves. This volume, therefore, is a study of the influence of the frequency of meals upon physical efficiency and industrial productivity. The attempt is made to discover and formulate the principle of the best mealtime interval, and the importance of this principle is emphasized by the fact that on the same amount of food the industrial output of factory operatives may be as much as 10 per cent greater under one mealtime arrangement than under another.

From studies first worked out in the laboratory, careful observations were made on 213 persons—children, students, clerks, and employees in a rubber factory. The contribution therefore is one of practical importance in everyday life as well as to industry and public welfare.

In addition to the theme of meal-times, diet and productivity, the 9 chapters take up nutrition, muscular efficiency, blood sugar, the respiratory quotient and its determination (as an index of efficiency), following which is a short appendix on the problem of industrial fatigue, and a bibliography of some length, also an index. The 35 tables and 31 figures have great instructional value and practically tell the tale in themselves.

Adapted as well to those not trained in physiology as to experts in nutrition, and indeed to general readers, the context is unusually clearly presented. Frequent repetitions have not detracted from the easily followed story, but, like the movie which shows up the hero, now from this point of view and now from that, the reader is charmed from cover to cover. Every possible question appears to have been foreseen and logically answered. For example, Why should we not eat candy or ice cream or take a soft drink for a "bracer" between meals? Like a novel, new characters appear as the chapters unfold, to be woven together with fine justice to each and all. It is indeed a romance in practical nutrition.

Naturally, diabetes and insulin come in for special attention. The most disturbing "villain" is the emotional factor. One "villain" seems to have been overlooked—stimulants substituted for food. Several other "intrinsic" ones such as physical impairment, degree of experience and skill, frequency of rest (or relaxation) and sleep, were probably connoted and ruled through controls, during the investigation. In a theoretical analysis of the possible elimination of fatigue made by the reviewer some years ago (Craig's *Diseases of Middle Life*, Vol. 1:88, 1923) he arrived at the conclusion that "if all the factors listed for the intrinsic causes of fatigue are properly supervised, it is only exceptionally possible to fatigue the human body by the extrinsic factors."

A reference oversight is that to the citation from "R" (C) P. McCord on pages 158-9 (including discussion), but the original may be found in McCord and Allen's *Industrial Hygiene for Engineers and Managers* (Harper's, 1931, p. 160). We note another omission from the Bibliography, viz., Amar's *Physiology of Industrial Organization*, 1919, and *The Human Motor*, 1921. Works on industrial efficiency and health have quite generally overlooked this undoubtedly important factor of *spacing meals*—even the late extensive 2 volume work, *Occupation and Health*, by the International Labour Office, while the old *Taylor Scientific Management* missed it completely, so that now one wonders whether the famous Schmidt in Taylor's experiment who increased his capacity of loading pig-iron from 12 to 47 tons per day did not do it more by piece-mealing than by "scientific management." Perhaps, too, the authors have explained the British supremacy—"three squares and two snacks each day"!

Finally, one is tempted to ask the

persistent question again: Is there a test for fatigue? Is not the answer, *the respiratory quotient*, as worked out by Haggard and Greenberg?

EMERY R. HAYHURST

Agents of Disease and Host Resistance, Including the Principles of Immunology, Bacteriology, Mycology, Protozoölogy, Parasitology and Virus Diseases—By Fredrick P. Gay and Associates. Springfield, Ill., and Baltimore, Md.: Charles C. Thomas, 1935. 1582 pp. Price, \$10.00.

The value of a comprehensive presentation of subject matter by one experienced student is admitted but it is felt that the rapid growth of Bacteriology makes it impossible for one individual to have first hand information regarding bacterial and other types of diseases. As the preface states, it is hoped that this book affords "a balance between the one-man text and the collected monographs of multiple authorities." It is believed that the close association and centralized interests of the participants have given the book a homogenous character which could not have been achieved by a widely separated group of writers.

The subject matter covers a much larger field than the usual text or reference book in Bacteriology. The chief author writes, "The 'Etiology of Disease' might be suggested as a simpler alternative title for this book." The varied contents reflect his conviction that the medical student should have presented to him "a larger background of disease causation, as well as a somewhat detailed consideration of the pathogenic bacteria, which although important, are by no means the only agents of disease," and he feels that the student will profit by viewing a "larger canvas depicting the entire range of disease causation,"—therefore the inclusion of material on disease producing

helminths, diseases of obscure etiology such as endocrine disturbances, epilepsy, etc.

The subject matter is divided into 12 parts. Part I serves as an introduction and presents the General Aspects of the Causation, Classification and Nature of Disease in an historical and philosophical fashion. Then follows a discussion of Inanimate Disease Agents and Tolerance. Chapters on Anaphylaxis and Allergy are given here instead of in the part dealing with Immunity, as is usual. Morphology and Physiology of the Living Disease Agents, ushered in by a chapter on the History of Bacteriology makes up Part III. Part IV deals with Infection in General, and Epidemiology. Part V is entitled "Resistance and Immunity" with a final chapter on Tissue Immunity.

Approximately one-third of the book is given over to the next part with the twenty chapters on "Pathogenic Bacteria and Diseases Produced by Them." The chapters on Streptococci and the Enteric Group of Bacteria, written by Dr. Gay, are especially complete. The remaining six parts discuss Spirochetes, Fungi, Viruses, Animal Pathogens, Diseases of Obscure Etiology, with a final group of chapters on "Practical Results in the Diagnosis, Prevention, and Cure of Infectious Diseases."

This final part discusses and appraises the various methods of disease diagnosis. No details of laboratory procedure are given,—the book is one "of principle rather than practice." The value of bacteriological and immunological tests used in diagnosis of infectious diseases is summarized in table form. This is one of many tables and charts given in the book. Some are reproduced from other texts; many are new. All add to the usefulness of the book.

Dr. Gay has entirely or partially written 23 of the 65 chapters, and Dr.

Jungleblut 10. Dr. McKinley is responsible for the entire section on Virus and Rickettsia Diseases.

The material is presented in a most interesting way and in an organized fashion which the experienced student will appreciate. The great number of contributions to the book do not interfere with the continuity of the material. In many cases, it is not necessary to see the signatures at the ends of the chapters to know the authors, but this adds interest.

It is printed on good paper and attractively gotten up, though its large size makes it a trifle unwieldy. The experienced student will be rewarded upon careful use of the vast amount of material with extensive references. One wonders if the undergraduate could make practical use of the book.

ANNA DEAN DULANEY

The Story of Medicine in the Middle Ages—By David Riesman, M.D. New York: Hoeber, 1935. 402 pp. Price, \$5.00.

The author has given us a most readable, interesting and scholarly history of medicine in the Middle Ages. He discusses the question of when the Middle Ages began and when they ended, and suggests that posterity may include us as having lived in the Middle Ages. This period is also spoken of as the Dark Ages. Singer says of it, "All theoretical knowledge was permitted to lapse; anatomy and physiology perished, prognosis was reduced to an absurd rule of thumb, medicine deteriorated into a collection of formulae punctuated by incantations; the scientific stream, its life-blood, was dried up at the source." The writer shows that from the period beginning with Gregory VII (1020-1085) there was definite progress in medical and surgical practice, and quotes Crump: "We need not praise, nor need we blame overmuch, but certainly we must under-

stand." In his Preface he says "The people who produced the Great Cathedrals, the French Chansons, the German Minnelieder, the Magna Charta, Parliamentary Government and above everything, the Universities, deserve our gratitude and admiration."

He sums up the advantages of the Middle Ages as being one dominant religion, one social system and one universal language. As there were comparatively few centers of learning, students centered at the points where learning was in evidence, first in the monastic schools, then the Cathedral schools, and finally in the great universities. The scholar in the Middle Ages was a distinguished man and learning was a mark of distinction. The doctor of medicine had a degree almost equal to a patent of nobility.

One of the things which we must be especially grateful to the Middle Ages is the preservation of literature due to the invention of printing. For 50 or 75 years after the invention of this art, printers were men of learning and spent their time in reproducing old texts, since there were few writers at the time. This resulted in the preservation of classical works which might otherwise have been lost. Many of the early medical books were textbooks for students and physicians written 200 or 300 years earlier. We owe then to the Middle Ages the preservation of the writings of the Greeks, Arabs, Romans and Jews, without which the progress of medicine and of culture would have been even slower than it was.

The chapters describing the rise of the universities in general and descriptions of special universities which follow are among the most interesting features of the book. These have been called "the greatest element in the emancipation of the human spirit," and if for no other reason than the founding of the universities, the Middle Ages are entitled to respect and gratitude. Rash-

dall is quoted as saying that they are "of greater and more imperishable value than its cathedrals." By the end of the Middle Ages some 80 universities had been founded in various parts of Europe. While many of these were short-lived, those of Paris, Montpellier, Bologna, Padua, Oxford, Cambridge, Vienna, Prague, Leipzig, Coimbra, Salamanca, Cracow and Louvain have existed down to the present day.

Even the confirmed student of history will lay this book aside with a warmer feeling toward the Dark Ages and a greater appreciation of what they did, in spite of their many failures and shortcomings. We cannot but feel that it is a distinct addition to our histories and written in a spirit of appreciation which will change the ideas of many concerning this period which has been almost damned by the title Dark Ages.

The book is excellently printed with few typographical errors, and is well indexed. The illustrations are fairly abundant and good.

MAZÏCK P. RAVENEL

Nutrition of Mother and Child—*By C. Ulysses Moore, M.D., M.Sc., (Ped.) Philadelphia: Lippincott, 1935. 258 pp. Price, \$2.00.*

The popularity of this attractive volume is attested by the 4th edition, which has been completely revised and rewritten. Considerable new material has been added on allergy, vitamins, the acid-base balance, mineral metabolism, and protein requirements. The book is written in non-technical style and is designed especially for mothers, nurses, and social workers.

Dr. Moore has been one of those most insistent upon the value of breast feeding in the face of refined methods of artificial feeding. His technic, *how to increase breast milk*, may be taken to be a standard method. It is described and illustrated thoroughly in this book. One wishes that Dr. Moore

had not insisted upon illustrating his breast-feeder tube, which is difficult to keep clean and of questionable value. It took years to get away from the old type of nursing bottle with a long rubber tube. Aside from this, mothers will find his clear-cut, understandable directions very helpful in supplementing directions given by a pediatrician or physician skilled in children's diseases.

RICHARD A. BOLT

Economic Problems of Medicine—

By A. C. Christie, M.S., M.D. New York: Macmillan, 1935. 242 pp. Price, \$2.00.

This is a very readable volume which discusses the subjects of medical ethics in relation to medical economics; medical education; private practice; the physician and the hospital; the physician in relation to medical organization and the community; workmen's compensation; health insurance; industrial medicine; the new methods of medical care now under trial or recommended by medical organizations; health insurance as a solution to the problem; and the essential elements in a comprehensive plan for medical care.

Deriving much from the reports of the Committee on the Costs of Medical Care, of which the author was a member and one of the signatories of the minority report, the endeavor is made to present the problem from the viewpoint of the private physician. To this source of material the author has added much new matter from foreign and American sources, the latter pertaining particularly to the Alameda County, Calif., Detroit, and Canadian plans, an approved industrial telephone company plan, and similar sources, as well as recent articles in the *Journal of the A.M.A.*

Undoubtedly the view presented is correct in that if the physician is to fulfil his whole duty to the community he must maintain a position of leader-

ship in all medical and health matters. He should not be blamed for the defective medical service so universally present today in America, which is an economic problem considerably beyond his control, but he should be treated fairly in any solution of the problem, including a wholesome recognition of the costs under which he performs his services. Things have gravitated to the present situation for many reasons, but a chief one is the bare subsistence level of a large proportion of the population.

For a reviewer, who is frank to acknowledge that he has a deeply social viewpoint, the subject seems very fairly presented and is a fine summary of facts, theories, and plausible solutions currently offered. Until, however, some means can be found to separate money from misery, as two distinct entities, and to consider the physician as essentially a disciple of humanitarianism, who, nevertheless, must find some adequate means of support and subvention in relation to the importance of the position which he plays in community and national welfare, the problem will continue to be mooted. The author holds that organized medicine can and must insure quality of service so that free choice of physician and confidential relationships may safely obtain, but, if so, it will have to be delegated much more authority than at present, both over its members and non-members, and here the responsibilities of the local medical society are duly stressed. The great problem of the patient's free choice of medical care or some other kind of care was probably not considered within the scope of the present volume.

Even the casual reader will be interested in the discussion on Health Insurance, and the final chapter, Essential Elements in a Comprehensive Plan for Medical Care. He will also be impressed with the great advantage we have in drawing upon the experiences

and mishaps of European schemes as well as the leadership in the solution of the economic problems of medicine which is appearing in various sections of our own country. The volume ends with quite an extensive bibliography and a brief index. It is the most convenient and recent assembly of the essential factors now at hand.

EMERY R. HAYHURST

Pediatric Treatment—By Philip S. Potter, A.B., M.D., F.A.A.P. New York: Macmillan, 1935. 578 pp. Price, \$5.00.

This book is just what its title indicates, a manual of pediatric treatment designed especially as a reference work for general practitioners. It is not written for specialists in children's diseases or in child hygiene. Very little space is given to etiology and pathology. The bulk of the book is composed of clear statements for treatment of the various diseases of infancy and childhood.

Dr. Potter has drawn largely from his own experience; but where standard procedures have been worked out by others, he has incorporated these and given exact references at the end of each chapter. The practical suggestions in the chapters on nutrition and infant feeding will be appreciated by the physicians struggling with difficult feeding cases.

The excellent arrangement of subject matter and typography of this manual, together with the complete index of authors and subjects, makes it a valuable volume for ready reference.

RICHARD A. BOLT

Work Relief in Germany — By Hertha Kraus, Ph.D. New York: Russell Sage Foundation, 1934. 93 pp. Price, \$.50.

This book presents a description of work relief in Germany prior to the recent political upheaval. The entire

work relief program was geared to meet the special and individual needs of the unemployed. Projects were developed and workers assigned to them for the primary purpose of preserving or restoring working capacity. The description of the special projects managed by the Work Relief Bureau clearly reveals this objective.

The work for wages plan in Germany was similar to that developed in the United States, except pay was based upon "the normal tariffs and wage agreements of the community" less 10 per cent, and the workers contributed to and were protected by state insurance for health, invalidity, unemployment, old age, and accident. Workers employed on work for relief basis, although ineligible for other forms of state insurance, were protected in case of accident.

"Shared work" was the term applied to the joint effort of government and industry to put men back to work. Selected private industries, taking workers from relief rolls, were subsidized upon their agreement to continue the employment of these workers for a specified time after the subsidy had expired.

Wages for all forms of work relief were paid in cash. The description of the function, organization, and procedure of the Work Relief Bureau is clear and concise. In view of the need for the development in the United States of a permanent public welfare program in which federal, state, and local governmental units will participate, Miss Kraus's discussion of the relation of the Work Relief Bureau to other public authorities is illuminating.

Although statistical and other supporting data are not presented, Miss Kraus, who for several years was the Director of Public Welfare in Cologne, Germany, writes with authority based upon intimate knowledge of the facts.

STOCKTON RAYMOND

Health Protection in the U.S.S.R.—

By N. A. Semashko. New York: Putnam, 1935. 172 pp. Price, \$1.75.

The author of this book was the first People's Commissar of Health, a post which he held for 12 years. He is therefore eminently fitted to write his side of the question. The book is frankly propaganda and belongs to the series called The New Soviet Library, being written by request.

The book outlines a more or less ideal administration of health, if one can believe in the method of operation now in vogue in Russia. Everything is under the Commissariat of Health, and the people are made to be good whether or not.

The book begins with a slap at the Tsarist régime and gives statistics of the deaths, child mortality, various epidemics, syphilis, etc., in that period. A glance at the Table of Contents shows that practically every subject pertaining to health and physical welfare is given consideration. The author says, "Thus unity in the organisation of the health service is the first distinguishing feature of Soviet medicine."

Among the striking features discussed is communal feeding. In 1931, 5 million workers and 3½ million office employees and peasants took their meals in public dining rooms, while 3 million school children were served hot lunches in school. The public dining rooms numbered 13,400, including 44 kitchen factories, which are described as "completely mechanised kitchens," each of which serves from 30,000 to 35,000 meals a day.

The book is interestingly written, but it is hard for us in this country to judge of its value, and we believe it will be a number of years before we can adequately judge of the success of the health program which the new government has inaugurated.

MAZÛCK P. RAVENEL

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

More on the Moot Subject of Poliomyelitis Vaccination—Infected monkey cord inactivated with formaldehyde was found to develop antibodies in experimental animals; then it was found safe for human administration. Large groups of children are being immunized and are being followed by controls.

BRODIE, M., and PARK, W. H. Active Immunization against Poliomyelitis. *J.A.M.A.* 105, 14:1089 (Oct. 5), 1935.

Kansas Dust and Health—Last summer's Mid-west dust storms which lasted for nearly 3 months increased morbidity and mortality from respiratory infections. There was no evidence that pathogenic microorganisms were carried by the dust.

BROWN, E. G., *et al.* Dust Storms and Their Possible Effect on Health. *Pub. Health Rep.* 50, 40:1369 (Oct. 4), 1935.

Emergency Training of Social Workers—Last year's training program of the Federal Emergency Relief Administration made it possible for states to secure for staff members training at accredited schools of social work. Suggestions for future programs were for longer study, better selection of students and need for choosing members for training on the basis of leadership ability.

BROWN, J. C. What We Have Learned about Emergency Training for Public Relief Administration. *The Family* 16, 6:172 (Oct.), 1935.

What Old and Young Sicken and Die of—Major causes of death are not

the most frequent causes of illness. The degenerative diseases top the former and the respiratory diseases the latter. Illness is most frequent under 5, least from 15 to 19. There are many other conclusions to be gleaned from this analysis of studies that have been reported in detail in earlier papers, another of which appears in *Public Health Reports* 50, 41:1404 (Oct. 11), 1935.

COLLINS, S. D. The Incidence and Causes of Illness at Specific Ages. *Milbank Quart.* 13, 4:320 (Oct.), 1935.

Tuberculosis and Climate—Factors which seem to influence tuberculosis death rates are: standard of education; risk of infection from negroes; life in dry, sunny, high climate. These are of more influence than per capita income and population density, according to a study of 150,000 deaths from 42 states.

COWLES, A., and CHAPMAN, E. N. A Statistical Study of Climate in Relation to Pulmonary Tuberculosis. *J. Am. Stat. Assn.* 30, 9:517 (Sept.), 1935.

All from a Sick Pig—Maine's first trichinosis epidemic enjoyed the distinction of being the largest reported. Of 71 persons known to have eaten the insufficiently cooked pork, 56 had symptoms. Twelve of those who escaped reacted positively to a skin test; all 25 showed eosinophilia.

DRAKE, E. H., *et al.* An Epidemic of Trichinosis in Maine. *J.A.M.A.* 105, 17:1340 (Oct. 26), 1935.

British Slum Clearance—In England it is usually the health officer who

instigates slum clearance schemes. What preparation he must have and how he should do the job are considered in this most interesting paper. One wonders how long it will be, if ever, before American health officials will be given similar powers and duties.

FAWCETT, H. A. *The Medical Officer's Practice of Housing.* Pub. Health 49, 1:6 (Oct.), 1935.

Mental Hygiene and Accident Prevention—Of all industrial accidents 85-90 per cent are said to have as their proximate causes the mental conditions of workers. This points to need for increased use of mental hygiene programs in industry. An analysis of what this involves by way of personnel and organization is given in detail.

GRANNIS, E. R. *Mental Hygiene as Applied to Industrial Accident Prevention.* Ment. Hyg. 19, 3:398 (July), 1935.

State Supervision of Industrial Health—Showing the need for industrial hygiene as a state health agency activity, the author points to the safeguards that should be thrown about this project.

GRAY, A. S. *Importance of Industrial Hygiene.* J.A.M.A. 105, 15:1158 (Oct. 12), 1935.

Professional Education of Nurses—Serious problems which confront nurses today are those of overproduction and under-education. Their direct cause is the apprenticeship system of education found in most schools of nursing. Responsibility for reform should be assumed by hospital authorities, officers of universities, the community, and the nursing profession.

HAWKINSON, N. X. *A Nurse's View of Nursing Education.* Mod. Hosp. 45, 3:67 (Sept.), 1935.

Thirty Dietary Substances—Very brief but inclusive is this summary of

the high lights of our knowledge in the field of nutrition.

McCOLLUM, E. V. *Food, Nutrition and Health.* Health & Phys. Ed. 6, 7:6 (Sept.), 1935.

Diphtheria Prophylaxis Experience—Observations covering 46,000 immunized school children indicate reduction of the expected incidence of diphtheria cases by more than 90 per cent. Immunity is greatest the year following treatment. Immunization of the majority reduces the rate among the non-immunized.

McKINNON, N. E., and Ross, M. A. *The Reduction of Diphtheria Following Three Doses of Toxoid.* J.A.M.A. 105, 17:1325 (Oct. 26), 1935.

Child Hygienists, Attention!—If regular hours of rest and conditions conducive to sleep are maintained, Nature can be trusted to see that the child gets enough rest. Experience in this nursery school belies the teaching of "authorities" who have insisted that, if a child does not fall asleep within a given time and sleep for a set period, someone is at fault. The findings should give relief to harassed parents.

REYNOLDS, M. M. *The Sleep of Young Children in a Twenty-four-Hour Nursery School.* Ment. Hyg. 19, 4:602 (Oct.), 1935.

About Abortions—In the group of women questioned, one-fifth of all pregnancies were terminated by illegal abortions, the per cent increasing as marriage lengthened. The practice has increased in recent years. Because abortion causes so many maternal deaths, this is a public health problem which cannot be ignored.

STIX, R. K. *A Study of Pregnancy Wastage.* Milbank Quart. 13, 4:347 (Oct.), 1935.

Every Community Needs a Mental Hygiene Program—That the mental hygiene clinic can develop a

community-wide program is well illustrated by description of the work done in Manchester, N. H.

STONE, S. What Mental Hygiene Means to a Community. *Ment. Hyg.* 19, 3:416 (July), 1935.

Bigger and Better Public Health—Public health as a concept needs broadening to include more than sanitation, epidemiology, and hygiene. The author visualizes a program covering economic security, housing, and medical care as well.

SYDENSTRICKER, E. The Changing Concept of Public Health. *Milbank Quart.* 13, 4:301 (Oct.), 1935.

Supreme Court Decisions about Milk—Reasonable licensing of milk producers and distributors, standards for dairy products, prevention of shipment of diseased cattle, and regulation of milk prices, all have been thoroughly established by a number of decisions of the U. S. Supreme Court.

TOBEY, J. A. Milk Control and the United States Supreme Court. *Pub. Health Rep.* 59, 40:1384 (Oct. 4), 1935.

BOOKS RECEIVED

A GEOGRAPHY OF DISEASE. A Preliminary Survey of the Incidence and Distribution of Tropical and Certain Other Diseases. By Earl Baldwin McKinley. Washington: The George Washington University Press, 1935. 495 pp.

INJURY AND INCAPACITY. By H. Ernest Griffiths. Baltimore: William Wood, 1935. 270 pp. Price, \$5.00.

DIAGNOSIS AND TREATMENT OF SKIN DISEASES, INCLUDING THE CARE OF THE NORMAL SKIN. By Jacob Hyams Swartz and Margaret Gilson Reilly. New York: Macmillan, 1935. 316 pp. Price, \$3.50.

PIONEERING WITH THE RED CROSS. By Ernest P. Bicknell. New York: Macmillan, 1935. 278 pp. Price, \$2.00.

DIET AND DIE. By Carl Malmberg. New York: Hillman-Curl, 1935. 149 pp. Price, \$1.50.

RADIUM TREATMENT OF SKIN DISEASES, NEW

GROWTHS, DISEASES OF THE EYES AND TONSILS. By Francis H. Williams. Boston: Stratford Books, 1935. 118 pp. Price, \$2.00.

INDIVIDUAL EXERCISES. By George T. Stafford, Harry B. DeCook and Joseph L. Picard. New York: Barnes, 1935. 111 pp. Price, \$1.00.

THE ALGAE AND THEIR LIFE RELATIONS. By Josephine E. Tilden. Minneapolis: University of Minnesota Press, 1935. 550 pp. Price, \$5.00.

DISEASES OF WOMEN. 8th ed. By Harry Sturgeon Crossen and Robert James Crossen. St. Louis: Mosby, 1935. 999 pp.

TEXTBOOK OF PHYSIOLOGY. 5th ed. By William D. Zoethout. St. Louis: Mosby, 1935. 694 pp. Price, \$4.00.

AN INTRODUCTION TO PUBLIC HEALTH. By Harry S. Mustard. New York: Macmillan, 1935. 250 pp. Price, \$2.50.

ASSOCIATION NEWS

SCIENTIFIC EXHIBITS AT MILWAUKEE

IN the first few years of its existence, the Committee on Scientific Exhibits has avoided setting standards for exhibitions or requirements for participation beyond those necessary for expedient management. Although scientific exhibits for medical and other professional groups and public health exhibits for popular audiences have been common for many years, there was little experience to determine which types of exhibits were best suited to the particular type of professional audience found at American Public Health Association meetings. The policy of the committee therefore has been to accept nearly everything available from reputable sources within space limitations, and even to make an effort to get exhibits which were of general interest for any reason.

Its most outstanding contribution in this respect was the exhibit from the German Hygiene Museum, shown at the Pasadena meeting, for which credit is especially if not wholly due to Dr. W. W. Peter, who in behalf of the committee successfully concluded the preliminary negotiations with the German authorities, which made this showing possible.

Such remarkable contributions, however, can be expected only rarely. In the meantime it is evident that scientific exhibits are classifiable into two groups—those which are strictly scientific, that is, designed for the information and interest of professional people alone; and those which are examples of popular health education as used by official and unofficial health agencies. In addition, the exhibits in recent years

have included displays which were pictorial reports of work done, methods of organization, etc., of various types of health organizations, particularly health departments of hostess cities, counties, and states.

The scientific exhibit at Milwaukee exceeded all expectations, both as to size and number of exhibitors. There were 41 separate exhibits covering 10,000 square feet of floor space. Many of the exhibits related to laboratory interests due largely to the splendid efforts of the Laboratory Section Scientific Exhibits Committee, under the chairmanship of Dr. Fred O. Tonney. Milwaukee and the State of Wisconsin provided many valuable exhibits, assembled by Dr. W. J. Egan, chairman of the sub-committee on local exhibits. For the first time, citations of merit were awarded to certain exhibitors for excellence of one kind or another. The committee of judges in making these citations commented on these meritorious exhibits as follows:

Dr. M. Fernan-Nunez, Department of Pathology, Marquette University School of Medicine. *Title: Tropical Diseases in Milwaukee*—Unique and striking method of display, which stimulates interest and illustrates in a simple manner, the methods used to detect the diseases.

Department of Clinical Pathology, University of Wisconsin and State Board of Health of Wisconsin, Laboratory of Hygiene. Dr. W. D. Stovall, Dr. S. B. Pessin and Dr. Lois Almon. *Title: Monilias—Classification and Pathogenicity*—A complete presentation of the subject from the standpoint of the pathologist and mycologist, arranged in an attractive and interesting display in such a way as to give the non-technical observer an idea of the subject and to stimulate his interest.

Public Health Records—The Commonwealth Fund—Dr. W. F. Walker. Demonstrating a unit of public health service records—practical, simple—especially designed for health officers.

Traveling Health Exhibit—Wisconsin Anti-Tuberculosis Association. Dr. Hoyt Dearholt, Director. Effective Visual Exhibit, in drawing and holding attention—teaches that tuberculosis is a community health problem, and what may be done about it.

American Red Cross—Milwaukee County Chapter. Insignia of organization displayed so as to leave no doubt of its sponsor. Arresting figure of nurse who does the work with simple explanation of the two fields of endeavor covered, make up the body of the exhibit. Clear, forceful and simple.

American Medical Association, Chicago, Ill.
Title: What the Public Is Thinking About

Health and What the Medical Profession Is Doing About It—Exhibit aims to show questions asked by the public, and physicians' answers to them. Illuminated chart draws attention to question, and carefully displayed literature the answers. Fairly inexpensive, simple, arresting and convincing.

The increasing interest in scientific exhibits as an important part of the A.P.H.A. Annual Meetings promises well for the success of the scientific exhibits at New Orleans. Information concerning scientific exhibits at the next meeting in that city in the fall of 1936 may be secured by addressing the Committee of Scientific Exhibits, at the headquarters office of the Association.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

L. I. Burrows, M.D., East Central State Teachers College, Ada, Okla., College Physician
C. R. Fargher, M.D., Wenatchee, Wash., Health Officer
M. Flint Haralson, M.D., 424 State Office Bldg., Denver, Colo., Acting Secretary and Executive Officer, State Board of Health
Arthur E. Lien, M.D., Court House, Spokane, Wash., County Health Officer and Physician
William F. Lippitt, M.D., Box 362, San Juan, P. R., Chief, Bureau of General Inspection, Dept. of Health
Ezequiel Martinez Rivera, M.D., Box 128, Hato Rey, P. R., Chief of Public Health Unit
Joseph A. Yuskanish, 121 Allen St., Nesquehoning, Pa., County Health Officer

Laboratory Section

Dr. Rafael del Valle Sarraga, P. O. Box 935, San Juan, P. R., Director, Chemical Laboratory, Dept. of Health
Miguel F. Godreau, M.D., Tuberculous Hospital, Guayama, P. R., Medical Director
Ralph S. Muckenfuss, M.D., Foot of E. 15 St., New York, N. Y., Associate Director, New York City Bureau of Laboratories
Stephen A. Osborn, B.S., 622 Globe Bldg., St. Paul, Minn., Economics Laboratory, Inc.

Clementine J. Prior, B.S., 604 Larson Bldg., Yakima, Wash., Clinical and Chemical Laboratory
Luis Saldana-Davila, P. O. Box 403, San Juan, P. R., Bacteriological Technician
William S. Sturges, Ph.D., Cudahy Packing Co., S. Omaha, Nebr., Bacteriologist

Vital Statistics Section

William L. Austin, Bureau of the Census, Washington, D. C., Director
Henry L. Porsche, 4967½ Lake Park Ave., Chicago, Ill., Chief Clerk, Board of Health
Herschel M. Wright, State Dept. of Health, Indianapolis, Ind., Registrar, Vital Statistics

Public Health Engineering Section

Ilbert O. Lacy, B.S., 1663 Columbia Rd., Washington, D. C., Sanitary Engineer, Resettlement Administration
Harley M. Riley, M.S., State Dept. of Health, Ithaca, N. Y., District Sanitary Engineer

Industrial Hygiene Section

Myer S. Bloom, M.D., 110 Oak St., Binghamp, N. Y., Industrial Clinic

Food and Nutrition Section

Milton R. Fisher, D.V.M., Municipal Courts Bldg., St. Louis, Mo., Supervisor of Milk Control

Jose Rivera Mundo, Dept. of Health, San Juan, P. R., Chief, Division of Foods and Drugs

A. A. Nicholas, Rm. 1806, 135 E. 42 St., New York, N. Y., Manager, Personnel Dept., Texas Company

Child Hygiene Section

Ruth E. Stocking, M.D., State Dept. of Health, Lansing, Mich., on Staff of Bureau of Child Hygiene and Public Health Nursing

Public Health Education Section

Helen A. Binnie, M.D., 7609 25 Ave., Kenosha, Wis., formerly Director of County Health Unit

Robert N. McCormick, Ph.D., Ball State Teachers College, Muncie, Ind., Teacher of Physiology, Hygiene and Anatomy

Joseph F. Montague, M.D., 139 E. 36 St., New York, N. Y., Editor, *Health Digest*

Jane Stafford, 2101 Constitution Ave., Washington, D. C., *Science Service*

Public Health Nursing Section

Glendora M. Blakely, 301 W. Monroe, Bloomington, Ill., Supervising Nurse

Mrs. Chester C. Bolton, 2301 Wyoming Ave., Washington, D. C., Board Member, N.O.P.H.N.

Doris Kerwin, R.N., 1018 N. Jefferson St., Neenah, Wis., Public Health Nurse, Wisconsin Anti-Tuberculosis Assn.

Ethel O'Connor, R.N., 208 S. Henry, Bay City, Mich., Tuberculosis Nurse

Helen Reinbach, R.N., Black River Falls, Wis., U. S. Indian Field Nurse

Bernice Steele, A.B., Box 224, Bristol, Tenn., Public Health Nurse, Sullivan County Health Dept.

Jane E. Thorstad, R.N., Monroe, La., Public Health Nurse, Ouachita Parish Health Dept.

Epidemiology Section

E. I. I. Baty, M.D., Buffalo, Tex., City Health Officer

Howard H. Volan, M.D., 225 Scott Ave., Syracuse, N. Y., Epidemiologist, Dept. of Health

Unaffiliated

Ruth H. G. Bassett, R.N., Indian Mountain School, Lakeville, Conn., Resident Nurse, Borgs School

J. Roswell Gallagher, M.D., The Isham Infirmary, Phillips Academy, Andover, Mass., School Physician

Joseph I. Linde, M.D., 45 Livingston St., New Haven, Conn., Director, Child Health Clinics

Josephine Roche, 294, The Treasury, Washington, D. C., Assistant Secretary of the Treasury in Charge of Public Health

Dr. Alfredo Sordelli, Velez Sarsfield 563, Buenos Aires, Argentina, S. A., Director, Instituto Bacteriologico del Departamento Nacional de Higiene

Harry E. Ungerleider, M.D., 393 Seventh Ave., New York, N. Y., Assistant Medical Director, Equitable Life Assurance Society

NEWS FROM THE FIELD

OCCUPATIONAL MORBIDITY AND MORTALITY STUDY

THE U. S. Public Health Service, in coöperation with the Works Progress Administration, has included in the national "health inventory" project (see editorial page 1370), a study, the object of which is the attainment of sickness and mortality rates in relation to occupation.

There is no doubt as to the need of this information for effective direction of national, state, and local programs of industrial hygiene and disease prevention in the adult population. From Census data it is estimated that the health of approximately 40 per cent of the total population is affected in varying degrees by their working environment. Thus among the 14 million persons employed in manufacturing and mechanical industries in 1930, more than 900 different occupational exposures to hazardous materials and conditions have been found. Many of these exposures undoubtedly affect health adversely. This supposition is substantiated by the finding of life insurance companies that the life expectancy of industrial workers is 6 to 7 years shorter than that of non-industrial workers. . . . It is the purpose of the Occupational Morbidity and Mortality Study to obtain sickness and death rates for each numerically important disease or disease group according to occupation. Sources of this information are the records of sick benefit associations and the records of personnel departments of companies having sick benefit societies. Information also is being obtained as to raw materials handled, the nature of the

end product of each process, and the working conditions surrounding each occupation. The schedule is so arranged that sickness and death rates can be computed for groups exposed to such specific potential health hazards as arsenic, lead, quartz dust, mercury, chromium, extreme temperature changes, dampness, etc. Thus, from a statistical analysis of the schedule, the effects of industrial exposures are measured in terms of occupational morbidity and mortality rates. It is expected that several hundred thousand of these schedules will be obtained by May 1, 1936.

It is anticipated that a number of interesting by-products will arise from this study: as, for example, the measurement of effects of marital status on health and longevity. The relatively high death rate usually recorded for single persons as compared with married persons frequently is ascribed to the factor of selection. Among persons physically able to engage in gainful pursuits, the selective factor may be expected to exert a relatively small influence, since invalids and persons having serious physical impairments would not be found in the population under consideration. Hence from this study the real effect, if any, of marital status upon health may be evaluated.

Information relating to the health of several hundred thousand persons engaged in a wide variety of occupations in about 35 basic industries will be accumulated and analyzed. Thus, from any viewpoint, the potential value of this survey to public health and general well-being in terms of dollars, health, and happiness is incalculable.

LAKE COUNTY, IND.

THE 1935 General Assembly of Indiana passed a law permitting the establishment of full-time county health units. The Lake County Commissioners on August 28, 1935, by resolution, set up the first full-time county health department in the state. The Commissioner of Health is Dr. William D. Weis, member A.P.H.A. In addition, provision was made for 1 sanitary inspector, 1 stenographer and clerk, and 4 public health nurses, all of whom will be employed as full-time workers after January 1, 1936.

NOBEL AWARD IN MEDICINE

THE Nobel prize in medicine was awarded to a German professor, Dr. Hans Speemann Frieburg of Breslau, October 24. The award carries with it about \$42,000.

N.O.P.H.N. APPOINTS DIRECTOR

DOROTHY DEMING, R.N., is the new General Director of the National Organization for Public Health Nursing. The Executive Committee made this appointment at the regular meeting on October 30.

Miss Deming has been a member of the N.O.P.H.N. staff since 1927 in the dual capacity of Assistant Director and editor of *Public Health Nursing*. She is familiar with every administrative detail and policy. This, added to her broad previous experience and her personal qualifications, assures unbroken continuance of the organization activities at a very important time in public health nursing development. Miss Deming will assume her new duties early in December.

NEW YORK HEART ASSOCIATION

A SCIENTIFIC Meeting of the New York Heart Association (Heart Committee of the New York Tuberculosis and Health Association) will be held at the New York Academy

of Medicine, December 3. Dr. Ernst P. Boas, Chairman of the Executive Committee, will preside over the meeting. Papers will be presented by Dr. Harold J. Stewart, Associate Professor of Medicine at Cornell University Medical College; and Dr. Archibald G. MacLeod, Associate, Hospital of the Rockefeller Institute.

RUSHWICK HEALTH CENTER OPENED

ON October 31, Mayor Fiorello H. LaGuardia of the City of New York dedicated the Bushwick District Health Center in Brooklyn. This Center is one of a series now operated by the Department of Health of the City of New York and is part of a project for new health centers being developed under Dr. John L. Rice, Commissioner of Health.

HEALTH OFFICERS FROM ABROAD

A STUDY tour of foreign medical officers of health, arranged by the Health Section of the League of Nations, began October 31 with the arrival in this country of seven health officers from foreign countries. Those who are participating in this interchange are:

Dr. L. S. Fridericia, Professor of Hygiene, University of Copenhagen

Dr. J. Parisot, Professor of Hygiene, University of Nancy

Prof. R. M. F. Picken, Welsh National School of Medicine, Cardiff

Dr. E. Rietz, Chief Medical Officer of Health, Stockholm

Dr. H. van der Kaa, Chief Health Inspector of the Netherlands, The Hague

Dr. B. Borcic, Chief of Health Service of Yugoslavia

Dr. Dela Johan, Secretary of State, Director of State Institute of Hungary, Budapest

The group was accompanied for a part of their itinerary by Dr. Frank C. Boudreau, Assistant Director of the Health Section of the League of Nations, Geneva. Dr. Boudreau has been the representative of the League

in making the arrangements for the study tour. The itinerary of this group included several days in Washington, a visit to Baltimore where the state and city health departments, as well as Johns Hopkins School of Hygiene were visited; thence the group went to Knoxville, Tenn., to see something of the medical and public health side of the work of the Tennessee Valley Authority. They will go to Chicago to study the work of the Chicago City Health Department. The remainder of their itinerary will include Detroit, Mich., Albany, N. Y., in connection with the work of State Health Department of New York; Boston, Mass., New Haven, Conn., and New York City.

JACKSON COUNTY, FLORIDA

JACKSON County Health Unit was organized September 1, 1935, at Marianna, Fla.—a 6 piece organization consisting of health officer, 3 public health nurses, sanitary inspector, and secretary clerk. Director of the department is Dr. Paul G. Shell, University of Tennessee, 1931. Dr. Shell received training in public health, School of Public Health, Johns Hopkins University, under provision for medical trainees for the Florida State Board of Health by the U. S. Public Health Service, completing that training on June 30.

The department's budget, \$13,000.00, is provided jointly, fifty-fifty, by the County and State Board of Health. Activities are rendered in coöperation with and under the supervision of the State Board of Health, Dr. Henry Hanson, F.A.P.H.A. State Health Officer.

WEST VIRGINIA MEETING

THE West Virginia Public Health Association held its annual program in connection with the sessions of the State Health Officers Conference at

Huntington, October 28 to 30. A program with both information and inspiration was provided which included speakers from outside West Virginia, such as Dr. Iago Galdston of the New York Academy of Medicine; Dr. Paul Padget of Johns Hopkins Medical School; Dr. Kennon Dunham of the University of Cincinnati; Dr. Allen W. Freeman, Dean of the School of Hygiene and Public Health, Johns Hopkins University; Dr. M. V. Ziegler of the U. S. Public Health Service, and Dr. Reginald M. Atwater, Executive Secretary, A.P.H.A.

Separate sessions were held for the health officers, the public health nurses, and the sanitary engineers, and these were followed by a session in which the findings of each group were brought to the attention of the whole conference.

The following officers were elected for the ensuing year:

President, Dr. A. J. Kemper, Clarksburg
1st Vice President, Dr. W. G. C. Hill, Moundsville

2nd Vice President, Dr. R. M. Pedicord, Wheeling

Secretary-Treasurer, Dr. John Thames, Charleston

Representative to the Governing Council, A.P.H.A., Dr. John Thames, Charleston

TEXAS PUBLIC HEALTH ASSOCIATION

THE Texas Public Health Association held its thirteenth annual meeting in Waco, Texas, October 16 to 18. Over two hundred attended the sessions. The first day was devoted to laboratory workers and nurses. The last two days were general sessions. Outstanding speakers were Dr. W. K. Sharpe, Jr., U. S. Public Health Service and William McCraw, Attorney General of Texas.

The next meeting will be held in October, 1936, at Kilgore, Texas. Officers for the ensuing year are: Dr. F. R. Tucker, Nacogdoches, President; Dr. Burke Brewster, Fort Worth, First Vice-President; Edward Robinson, Dal-

las, 2nd Vice-President; Mrs. Ida Levinson, Houston, 3rd Vice-President; H. E. Hargis, 4th Vice-President, and L. E. Bracy, Austin, Secretary-Treasurer.

SOUTHERN BRANCH ELECTS

AT its Fourth Annual Meeting, held November 19-20 in St. Louis, Mo., the Southern Branch elected the following officers for the forthcoming year:

President: I. C. Riggin, M.D., Richmond, Va.

First Vice-President: C. J. Vaughn, M.D., Lexington, Miss.

Second Vice-President: Frances Montgomery, R.N., Montgomery, Ala.

Third Vice-President: M. Z. Bair, Little Rock, Ark.

Secretary-Treasurer: G. Foard McGinnes, M.D., Richmond, Va.

MICHIGAN PUBLIC HEALTH ASSOCIATION

NEWLY elected officers of the Michigan Public Health Association are as follows:

President: Garner M. Byington, M.D., Battle Creek.

Vice-President: J. D. Brook, M.D., Grand Rapids.

Directors (re-elected): Fred M. Meader, M.D., Detroit; C. D. Barrett, M.D., Lansing; John L. Lavan, M.D., Kalamazoo.

New Director added: Dr. David Littlejohn, Midland.

These four directors are in addition to the three directors—Dr. V. K. Volk, of Pontiac, William R. Davis, D.D.S., of Lansing, and Mrs. Hugh Gaston, R.N., of Sault Ste Marie, whose terms end next year.

PERSONALS

DR. FRANK V. CHAPPELL, University of Tennessee—1903, was appointed and has begun his duties as District Health Officer, Jacksonville District, with the Florida State Board of Health, September 1.

Dr. Chappell received training in

public health recently in the School of Public Health, Johns Hopkins University, under provision for medical trainees made available to the Florida State Board of Health by the U. S. Public Health Service. He relieves Dr. Thomas E. Morgan, who, through a fellowship in public health granted by the Rockefeller Foundation, is attending the School of Public Health, regular course, Harvard University.

THOMAS M. RIVERS, M.D., member A.P.H.A., of the Rockefeller Institute for Medical Research, New York, delivered the annual Lilly Heard Anderson Lecture in Pediatrics at the Academy of Medicine in Atlanta, Ga., November 14. His subject was "Virus Diseases of the Central Nervous System."

DR. DAVID L. EDSELL, member A.P.H.A., was given an honorary dinner by the Harvard Medical School Alumni Association, at the Harvard Club of Boston, October 23, on the occasion of his retiring as Dean of the Harvard Medical School and School of Public Health. James B. Conant, LL.D., President of Harvard University, presided, and speakers included A. Lawrence Lowell, LL.D., President Emeritus of Harvard, and Dr. Charles S. Burwell, Dean of the Medical School.

DEATHS

DR. CHARLES E. BANKER, former Chief of the Division of Epidemiology of the New York City Health Department, died November 25. He retired in June, 1935, after 37 years' service with the Department.

HENRY FAIRFIELD OSBORN, Sc.D., President of the American Museum of Natural History, New York, died November 6, at the age of 78.

CONFERENCES

- Dec. 5-7, Annual Conference of the National Society for the Prevention of Blindness, New York, N. Y.
- Dec. 27, American Water Works Association—New York Section, New York, N. Y.
- Dec. 27, 28, Sixteenth Annual Meeting, American Student Health Association; Hotel Pennsylvania, New York, N. Y.
- Dec. 30-31, Fourth Annual Christmas Meeting of the Laboratory Section, Canadian Public Health Association, Toronto, Ont.
- Dec. 30-Jan. 4, 1936, Winter Meeting of the American Association for the Advancement of Science and Associated Societies, St. Louis, Mo.
- Jan. 27-31, 1936, Fourth International Heating and Ventilating Exposition, Chicago, Ill.

- Apr. 1-3, 1936, American Water Works Association—Canadian Section, Hamilton, Ont.
- Apr. 22-25, 1936, National Tuberculosis Association, New Orleans, La.
- May 11-15, 1936, American Medical Association Convention, Kansas City, Mo.
- May 14-16, 1936, American Water Works Association—Pacific Northwest Section, Aberdeen, Washington.
- June, 1936, Seventh Annual Meeting. Western Branch, A.P.H.A., Vancouver and Victoria, B. C.
- June 8-12, 1936, 56th Annual Convention, American Water Works Association, Los Angeles, Calif.
- July 27-31, 1936, Second International Congress on Mental Hygiene, Paris.
- Sept. 8-10, 1936, International Union Against Tuberculosis, Lisbon, Portugal.

Application for Membership

I wish to apply for membership in the American Public Health Association.

Name
Print name in full and give degree

Street and City..... State.....
For correspondence and the Journal

Present public health occupation.....

REQUIREMENTS: Persons professionally engaged or interested in public health work are eligible for election as Members of the Association.

DUES: Dues of Members are \$5.00 per year, which includes an annual subscription to the American Journal of Public Health. Persons joining the Association after July 1 are requested to pay \$7.50, covering a year and one half from July, 1935, to December, 1936.

AMERICAN PUBLIC HEALTH ASSOCIATION
50 WEST 50TH STREET, NEW YORK, N. Y.

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